ENGINEERING NEWS-RECORD

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Why Armco Drainage Structures are Selected for the "Tough" Jobs

They offer *proved durability* for problems of severe corrosion, high fills, unstable soil

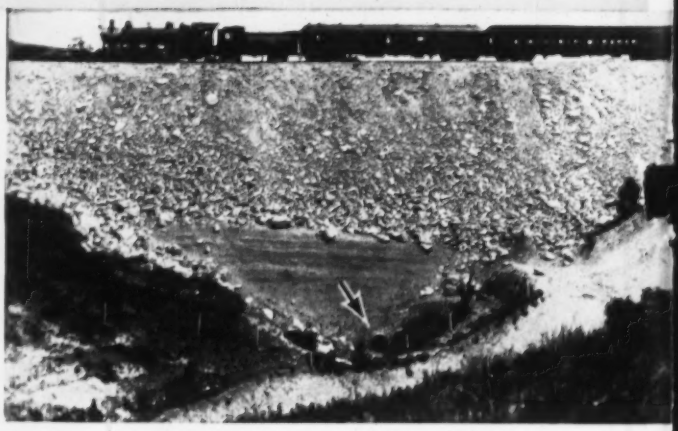
Armco Corrugated Metal Drainage Structures are not "cure-alls." But they have an impressive record of providing an economical solution for difficult drainage problems, as well as normal installations.

You will find an Armco Drainage Structure—in a size, shape, gage and coating—to meet requirements *exactly* on practically any drainage job. And they are assurance of both material and structural durability when installed according to recommended practices.

Structural durability is due to the flexible strength inherent in corrugated metal pipe. Instead of breaking or cracking, the pipe flexes under shifting or uneven loads. Material durability is verified by the thousands of installations, made under various conditions, still giving excellent service after as many as 50 years.

If you believe your drainage problem is more complicated than most, you will find Armco sales engineers are well qualified to suggest an economical solution. And with 55 Armco Plants located in all sections of the country, quick delivery is assured.

Armco Corrugated Metal Drainage Structures are only one of a diversified group of Armco Products for drainage and construction in municipal, industrial, railway and highway applications. For more data, write us. Armco Drainage & Metal Products, Inc., 5697 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.



HIGH FILL. This old photo shows a 60-inch-diameter Armco Corrugated Metal Pipe (at arrow) installed in 1928 by a Western railroad under 77 feet of fill. Recently inspected, the 29-year-old pipe is still in good alignment and functioning satisfactorily.

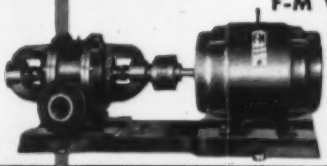
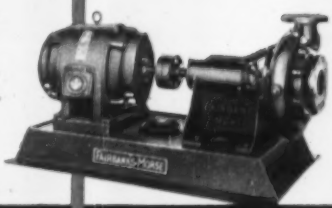
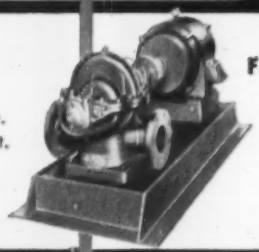
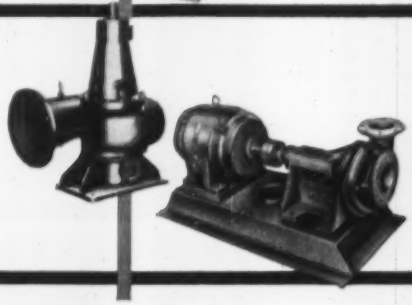
UNSTABLE FOUNDATION. Twin 102-inch diameter Armco MULTI-PLATE® Pipes were placed at the 50-foot level in a 160-foot fill in creating a large lake for a hydraulic dam. Consolidation of the fill was anticipated by placing a 2-foot camber in center portion of the pipes. This settlement, plus a flash flood, caused the foundation to settle 30 inches. Today the pipes are in excellent structural condition.

SEVERE CORROSION. This 42-inch-diameter Armco ASBESTOS-BONDED® Pipe was threaded through a disintegrating monolithic sewer in 1947. Currently operating in a pH range of .6 to 11., and velocity of 15 to 20 feet per second, inspection this year shows the pipe to be in good condition.

Armco Construction Products

ARMCO®

Guide to better pump selection

for		specify
boiler feed condensate return hot and cold liquids chemicals refrigerants, etc.	up to 200 gpm. pressures to 900 ft.	 **F-M WESTCO PERIPHERAL PUMPS** High pressure at normal operating speeds. Handle widely varying heads with little change in capacity. Sizes 1¼" through 2½".
hot and cold liquids liquid circulation nonviscous liquids boiler feed cooling towers, etc.	up to 900 gpm. pressures to 525 ft.	**F-M BUILTOGETHER CENTRIFUGAL PUMPS** General-purpose, close-coupled pump and motor units mount in any position—horizontal, vertical or angular. Sizes ¾" through 5".
sewage slurries paper stock fruit shrimp vegetables, etc.	up to 30,000 gpm. pressures to 175 ft.	 **F-M NON-CLOG PUMPS** Unexcelled for clog-free handling of liquids with solids in suspension. Sizes 2" through 20". Vertical or horizontal. Bladeless or conventional.
water supply plant service booster circulating air conditioning refrigeration chemical liquids boiler feeds, etc.	up to 50,000 gpm. pressures to 700 ft.	 **F-M SPLIT-CASE CENTRIFUGAL PUMPS** High, sustained efficiency over wide range of conditions. Low-cost maintenance. Sizes 1½" through 36". Single stage or multistage.
hot and cold liquids chemicals circulating liquids nonviscous liquids cooling towers condenser circulation, etc.	up to 100,000 gpm. pressures to 250 ft.	 **F-M END-SUCTION PUMPS** A wide line of rugged, precision-built pumps. Sizes ¾" through 54". Horizontal or vertical centrifugal.

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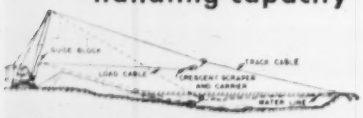
extends the reach of your crane

the CRESCENT SCRAPER...
increases its handling capacity



Use This Fast, Economical Method for:

- Cleaning Ponds
- Cleaning Under Bridges
- Trenching Streams
- Building Reservoirs
- Sludge Removal
- Beach Construction

This Indiana contractor used the track cable method with a 1½-cu. yd. Crescent Scraper to trench across a river. After the water main was placed, the scraper backfilled the trench.

Boom support enabled this crane to use a larger Crescent. After a sub-grade of coral was placed, the 4-yd. scraper was reversed and used to grade the beach.

Get facts on how the capacity of your crane can be increased up to 50% or more by replacing your dragline bucket with a Crescent Scraper. Give us make, model and boom length and we will tell you the largest size Scraper your crane can handle. Field Report 228 and Catalog J give more information on Scrapers with cranes.

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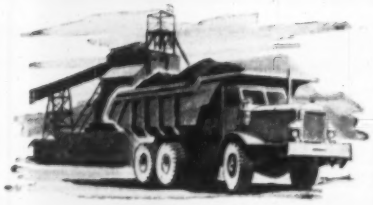
New all-nylon

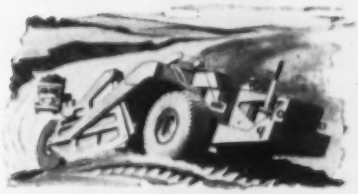
B.F.Goodrich

ROCK SERVICE TUBELESS



FOR MINES

QUARRIES



DIRT-MOVING JOBS

FLEX-RITE construction prevents unnecessary tire failures!

THE new B.F.Goodrich Rock Service tire—unlike an ordinary tire—is *built to its inflated shape*. When inflated, the tire body is not distorted. The whole tire flexes evenly, uniformly. No *localized* stresses that often cause unnecessary tire failures. FLEX-RITE construction eliminates this major cause of tire trouble and expense!

New B.F.Goodrich Rock Service tires are built with FLEX-RITE nylon cords. There are no cross threads to rub and chafe, creating tire-killing heat. FLEX-RITE nylon cords withstand double the impact of other materials, resist heat blowouts and flex breaks. Result: more retreadable Rock Service tires.

Greater traction! Puncture protection!

The double chevron tread gives maximum traction and skid resistance in forward or reverse. Rugged sidewalls defy rock bruises. V-shaped grooves expel stones. B.F.Goodrich Tubeless construction runs cooler, protects against punctures, cuts maintenance costs, is easier to service.

See the new, money-saving Rock Service nylon tire at your B.F.Goodrich dealer's today. It's the most advanced tire on the market today built for off-the-road hauling. *B.F.Goodrich Tire Co., A Division of The B.F.Goodrich Co., Akron 18, Ohio.*

Specify

B.F.Goodrich tires when ordering new equipment

B.F.Goodrich
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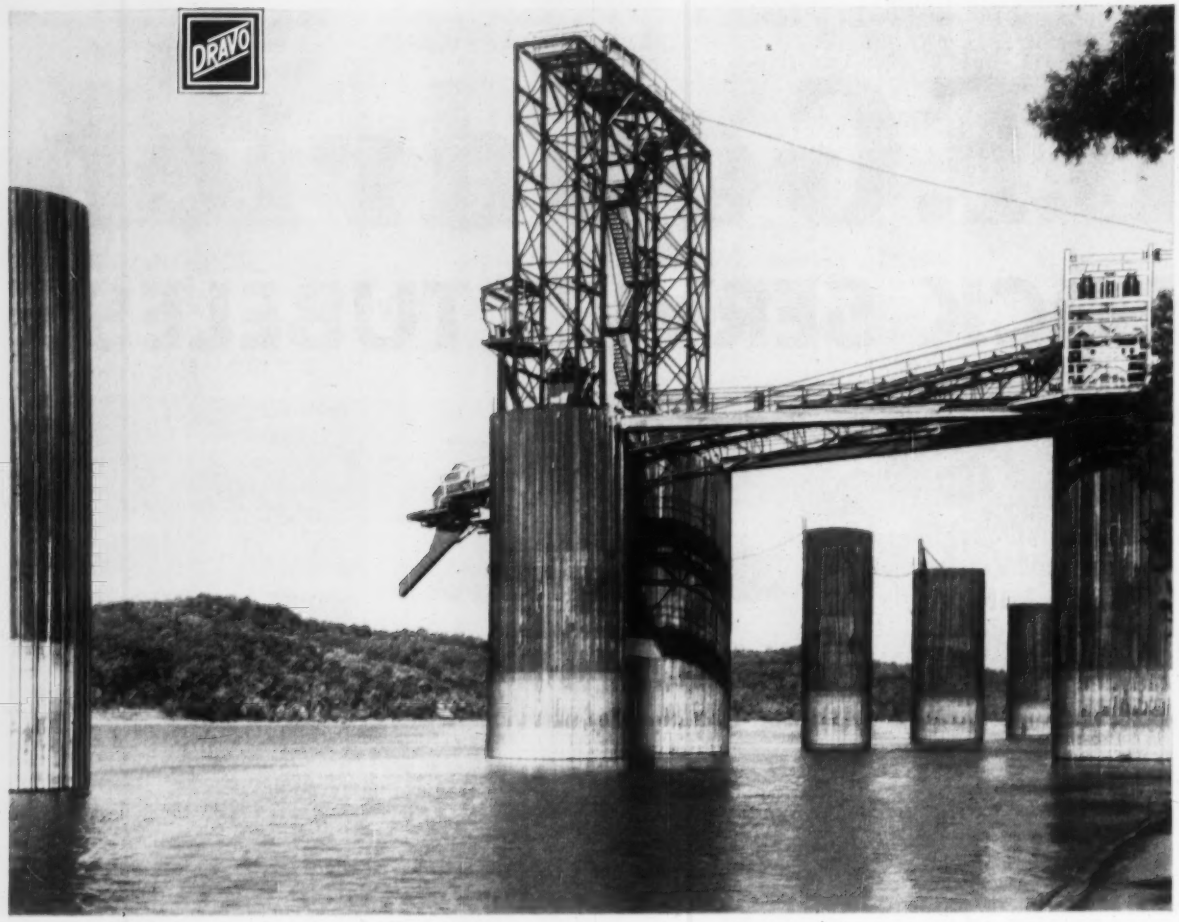
Your B.F.Goodrich dealer is listed under Tires in the Yellow Pages of your phone book.



"MILLION TON" dock for new DeKoven Mine

Pittsburgh & Midway Coal Mining Company can load more than a million tons of coal annually at this modern, cellular type barge dock near Sturgis, Kentucky, on the Ohio River. A two-mile long, 42 inch conveyor belt connects the facility with the company's new DeKoven mine.

Eleven cells, three of which support the loading mechanism, are spaced along 1175 feet of shoreline. Constructed of interlocking sheets of steel piling driven to rock, each cell is filled with sand and gravel and topped with concrete. Ruggedness, economy and minimum maintenance make this an ideal type of dock for most purposes.

In the past eight years, Dravo has installed more than 100 of these docks for firms in the chemical, steel, coal, utility, railroad, petroleum and other industries. For more information on this or any of the products and services shown below, write to DRAVO CORPORATION, PITTSBURGH 25, PENNSYLVANIA.

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Blast furnace blowers · boiler & power plants · bridge sub-structures · cab conditioners · docks & unloaders · dredging · fabricated piping

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FULL MEASURE—FROM CUT TO FILL!

Big Diesel Power . . . Allis-Chalmers 844-cu in. engine delivers more power per pound of gross vehicle weight . . . more torque when loading . . . more *drive* when hauling and spreading.

Correct Weight Distribution. When empty, 66 percent of weight is carried on tractor wheels for greater driving ability. When loaded, the total weight is equally distributed on each of the four wheels for maximum flotation, traction and tire life.

Exceptional Maneuverability with fast, positive 90° steering. Positions quickly in the cut, moves fast off the fill. Two-stage hydraulic steering maintains accurate control on the haul road.

The TS-260 also offers true "boiling action" loading . . . positive forward forced ejection for quick, clean spreading . . . heavy-duty power train . . . and many other advantages you'll have to *see* to fully evaluate. Ask your nearby Allis-Chalmers dealer for a working demonstration soon, on *your* job, and see why the profit-producing TS-260's are making new friends every day. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

Engineering in Action

Special auxiliary wheels . . . to meet highway weight limits. Twin front wheels are attached quickly and easily to distribute weight . . . let you move the TS-260 between jobs on its own power.

Powered-Widening plus Full Portability

...puts you way ahead with REX® Concrete Finishers

High speed...high capacity...and *highest* in operating advantages, these are your immediate rewards with Rex Concrete Finishers.

They have instantaneous powered-widening...right during operations. Width changes are made non-stop for tapered slab and interchange work. For straight lane work, you're also time ahead. They adjust to the right form size in moments.

Rex Powered-Widening is today's most advanced and trouble-free principle. With exclusive double-action design, *both* main frames are powered out or powered in *together*. It's a perfectly synchronized, foolproof system with positive, smooth chain, sprocket and rack operation. Its single lever is fast, easy.

Alone, Rex Powered-Widening is a finisher advantage that performs time-saving wonders. But note all the major work benefits of Rex Finishers...and you know why these modern, high-speed finishers are preferred by today's busiest contractors:

- **Easy-traveling portability...dual rubber-tire transportation wheels are hydraulically lowered, self-locking.**
- **Biggest screeds...16″ front and rear...hydraulic up-down operation.**
- **More speeds...fastest operation of all, full 110′ per minute travel speed. 6 forward, 6 reverse, 4 screed speeds ...total 24 working combinations.**
- **Better balanced design with biggest channel frames (15″ members)...absolutely no side sway, weaving... no rocking of the forms.**
- **Smooth efficiency...ball and roller bearings used throughout...no bushings.**
- **All these advantages plus Powered-Widening with power on *each* main frame. No concentrating of action on a single point...no twisting, binding, etc.**

Bring yourself up to date on the industry's most complete and modern line. Write for bulletins. CHAIN Belt Company, 4633 W. Greenfield Ave., Milwaukee 1, Wis.

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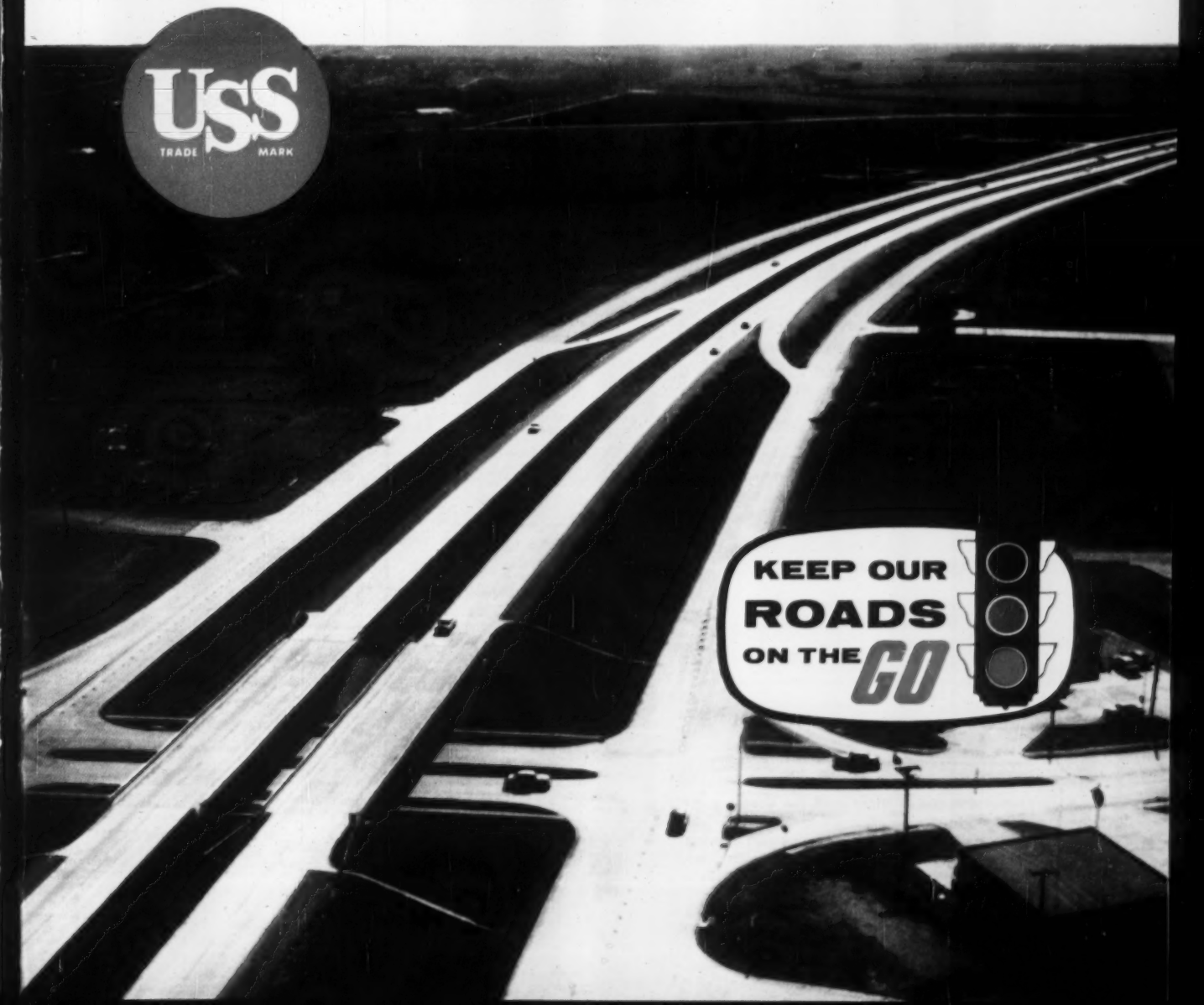
Texas is off to a flying start on the Interstate Highway Program

FOR TEXANS, famous for doing things in a big way, the Interstate Highway Program—the biggest construction job ever conceived by man—has a natural appeal. Perhaps that is why Texas, with a total of 2912 miles of Interstate Highway scheduled for the State, is already working on 293.3 miles of this superhighway network and at present leads the Nation in the number of miles underway.

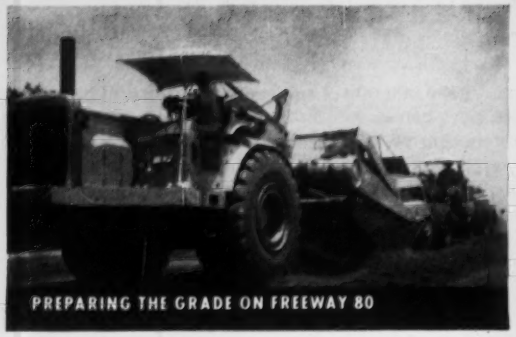
In the Dallas district alone, work involving $33,000,000 worth of Interstate Highway construction is progressing at top speed. An additional estimated $136,000,000 of road construction will be required here before completion.

Construction on the Interstate Network is also being rapidly pushed forward elsewhere in Texas, specifically in Jefferson, Bexar, Orange, Houston, Harris and McLennan Counties. The State program was developed and is under the direction of D. C. Greer, State Highway Engineer.

Judging from what has been accomplished to date, Texas, which ranks first in the number of designated miles of the Interstate Highway System, may also be first among the States in having its part of this vast undertaking finished and ready for traffic.



. . . and products of United States

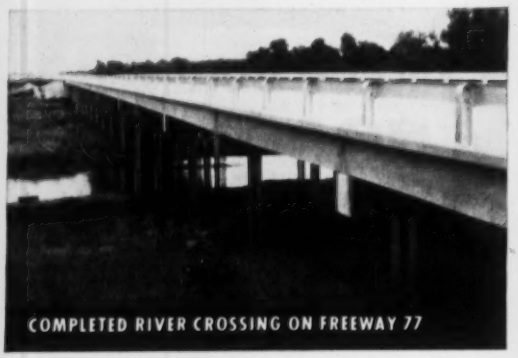


PREPARING THE GRADE ON FREEWAY 80

The time and price limits set for the Interstate Highway Program would be impossible to meet without the big-capacity, versatile construction equipment that America's road builders now have at their disposal. This equipment *must* have the stamina to stay on the job day after day. That's why USS High Strength Steels and USS "T-1" Constructional Alloy Steel are so widely used in all parts that take a beating.

PIER CONSTRUCTION ON FREEWAY 77, DALLAS

Every $1 million of Interstate Highway construction will require an estimated 162 tons of steel bars for structural concrete reinforcement. USS DI-LOK Reinforcing Bars, which are specifically designed to produce better reinforced concrete at lower cost, feature a continuous diamond-locking deformation that assures more positive anchorage, reduces cracking to a minimum and makes shorter splices possible.



COMPLETED RIVER CROSSING ON FREEWAY 77

Steel H-Beam Bearing Piles perform a dual function here by acting both as bearing piles and pier bents. Where high load-bearing capacity and dependable protection against flood water and scour are needed, USS H-Beam Bearing Piles supply them. Strong, permanent and easily driven, they offer a practical solution for many foundation problems, especially when unstable conditions exist.

TO SPEED UP TRAFFIC THROUGH DOWNTOWN DALLAS

The intricate approaches of Freeway 77, being completed in the heart of Dallas, typify the important role that products of United States Steel will play in the Interstate Highway Program. The cement and reinforcing bars for concrete piers and roadway, the structural steel used to support the bridge deck and the special steel sections that form the sturdy bridge railing—all are available from United States Steel.

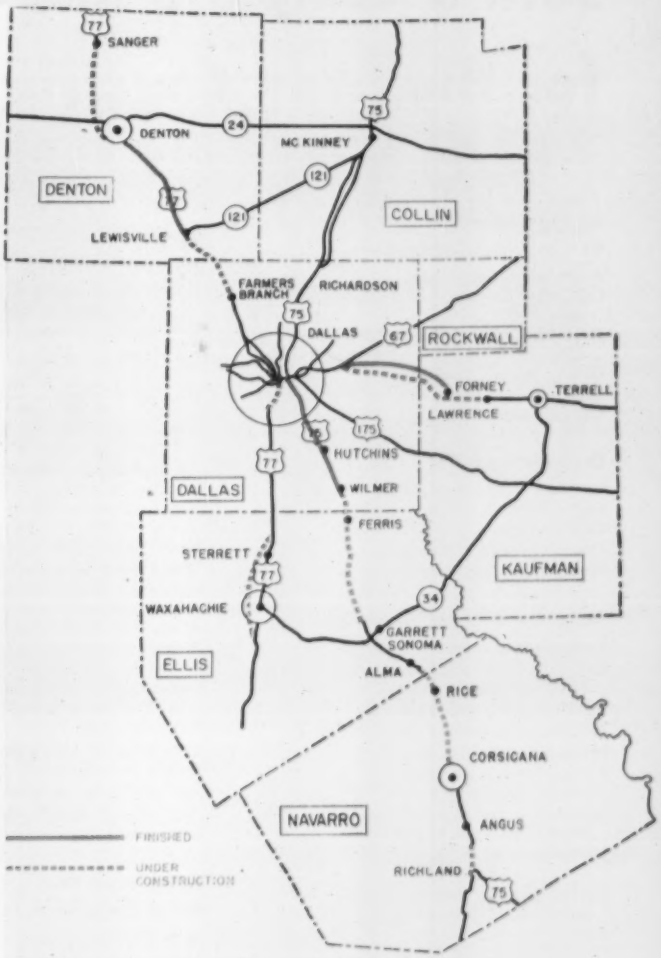
Steel help keep the job on the go

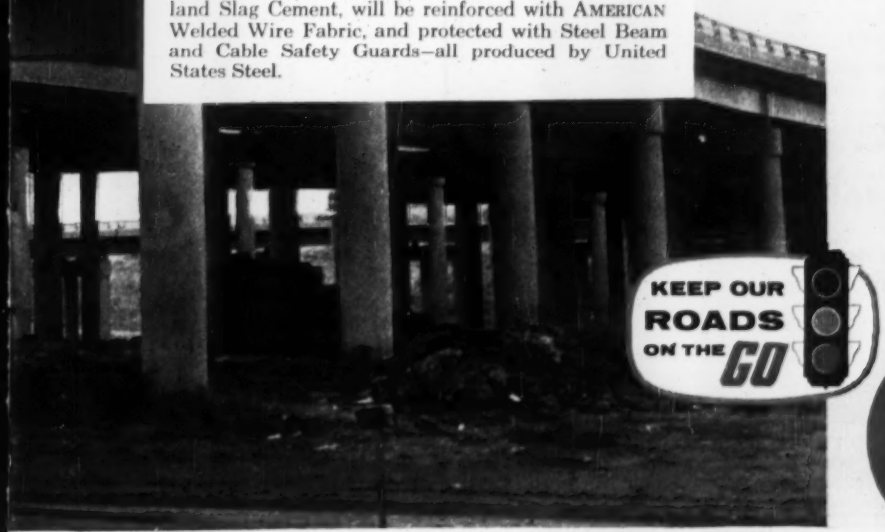
REINFORCED CONCRETE BRIDGE ON FREEWAY 75

For such structures, ATLAS DURAPLASTIC—an air-entraining portland cement—provides a more plastic concrete and uniform appearance. For concrete bridge decking it provides a more cohesive concrete that is fortified against freezing-thawing weather. For prestressed concrete bridge girders, AMERICAN Super-Tens Stress Relieved Strand and Wire is about six times stronger than ordinary steel.

COMPLETED CONSTRUCTION ON FREEWAY 80

This portion of the Interstate Highway System is typical of the superhighway network that in a few short years will provide faster, safer, cheaper travel for America's motoring millions. Many of these expressways will be surfaced with UNIVERSAL Portland Slag Cement, will be reinforced with AMERICAN Welded Wire Fabric, and protected with Steel Beam and Cable Safety Guards—all produced by United States Steel.





HOW'S THIS FOR PROGRESS!

- As of August 1st, the status of the Interstate Highway Program in District No. 18, Dallas, Texas, was as follows:
- On Freeway 77 North, from the Dallas city limits to Denton, construction entails 35 miles of superhighway of which 14 miles were completed and 21 miles under construction.
- On Freeway 80 East, 10½ miles were completed and 18 miles under construction.
- On Freeway 75 South, 25 miles were completed, 29 miles under construction.
- On Freeway 77 South, 12 miles of Interstate Highway by-passing Waxahachie were under construction.
- In downtown Dallas, construction of the approaches to Freeway 77 were nearing completion.

USS TRADE MARK

UNITED STATES STEEL

Only United States Steel can offer you such a complete line of products for Highway Construction

Special Steels for Equipment Construction

Abrasion-resisting steel
Constructional alloy steel, *Carilloy* and *"T-1"*
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Tubing, seamless mechanical, *Shelby*

Drainage Products

Sectional plate pipe arches, *AmBridge*
Culvert sheets, corrugated steel
Culvert pipe
Culvert pipe, perforated
Road flume, *Ro-Drain*

Bridges and Bridge Foundations

Bridge construction service
Structural steel shapes and plates, carbon, alloy and high strength
Bearing piles, steel H-Beam
Bearing piles, tubular steel, *National*
Sheet piling, steel
Bridge flooring, armored, *AmBridge I-Beam-Lok*
Bridge flooring, concrete-filled grid, *AmBridge I-Beam-Lok*
Bridge flooring, open grid, *AmBridge I-Beam-Lok*
Bridge sidewalk flooring, T-grid, *AmBridge I-Beam-Lok*
Bridge railing, *National*
Grating, expanded metal
Expansion joints
Bridge nuts, pins and tie-rods
Rivets
Eye-bars
Bolts, high strength steel
River-bolts, high strength steel
Creosote—for pressure treating bridge flooring and wood piling

Pavement Construction Products

Portland cements, *Universal* and *Atlas*
Portland slag cements, *Universal*
Air-entraining portland cements, *Atlas Duraplastic*
Air-entraining portland slag cements, *Universal*
High-early portland cements, *Atlas*
White cements, *Atlas*
Concrete reinforcing bars, straight and bent, *Di-Lok*
Alloy steel reinforcing bars, *Carilloy*
Welded wire fabric for reinforcing concrete, *American*
Stress-relieved strand and wire for prestressed concrete, *Super-Tens*
Concrete forms
Concrete form insulation
Road-joint assemblies, *American*
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Reader Comment

More on Anchor Bolts

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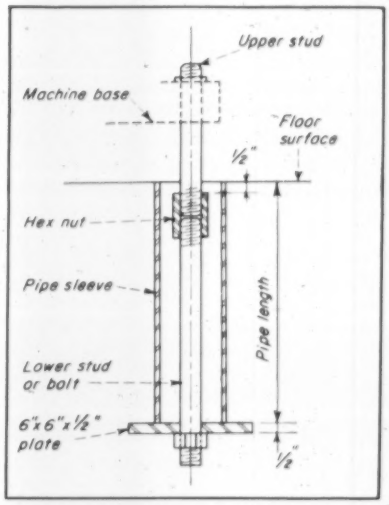
A bolt should never have to be drifted more than once it's diameter. This is best accomplished by placing the nose of a fuller against the heated bolt, placing the nut at the top and striking lightly.

The type of bolts shown in your article are all of a nature involving considerable expense to manufacture, and still allow only a fair amount of adjustment.

BERNARD DAW
Design Draftsman
Chase Brass & Copper Co., Inc.,
Cleveland, Ohio

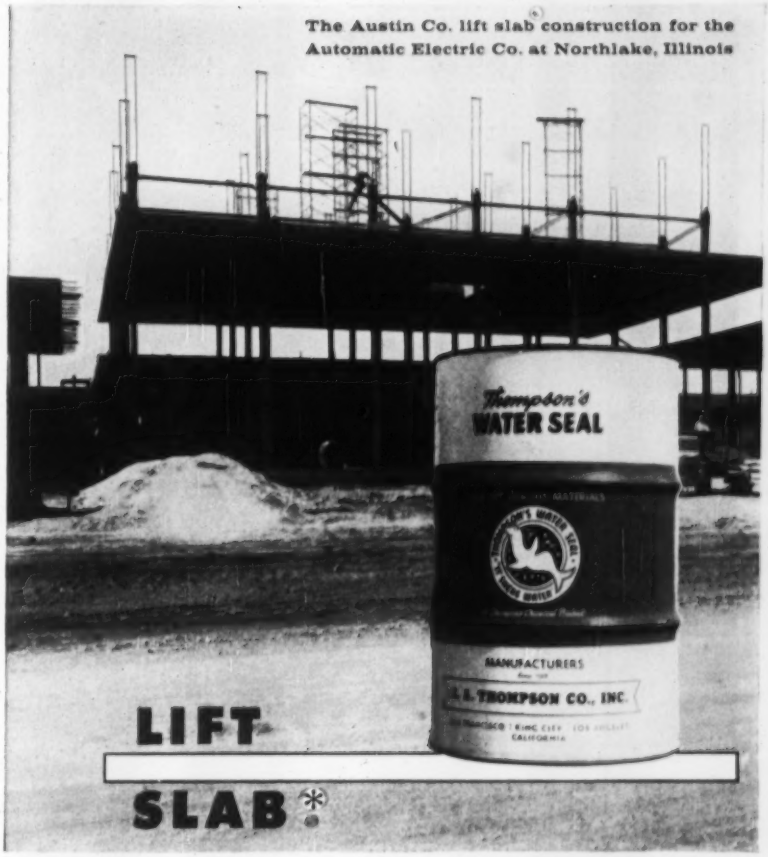
•

SIR—Here is a copy of our standard anchor bolt drawing. The upper stud is placed after the machine has been set on leveling blocks. Nothing projects



Engineering News-Record welcomes expression of opinions from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance. Letters should be addressed Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

The Austin Co. lift slab construction for the Automatic Electric Co. at Northlake, Illinois



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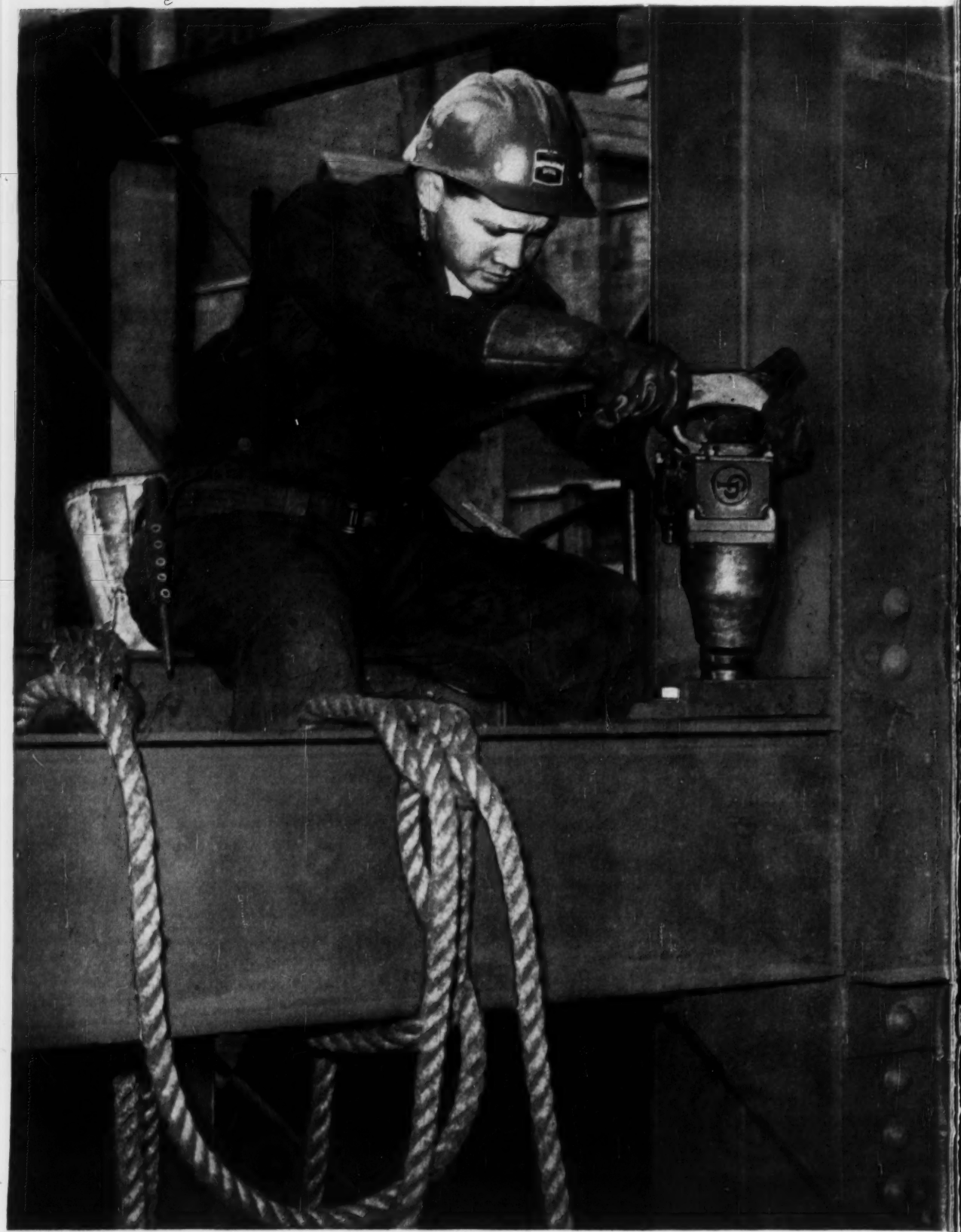

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above the subfloor to hinder sliding the machine into place.

M. T. Miller
Staff Engineer
Caterpillar Tractor Co.
Peoria, Ill.

Red Tape in Contracts

Sir—It is my guess that ¾ of 1% of every construction dollar spent by the federal government is the amount of the cost, to the contractor only, of handling certified copies of payrolls and affidavits pertaining thereto.

I don't believe the Davis-Beacon Act, Wage Hour Law, etc., ever contemplated that each contracting officer might demand different information and a different method of reporting and a different method of making up payrolls.

I further don't believe that Congress ever contemplated permitting a contracting officer to make such submissions a condition precedent to any payment under a contract. I have protested specific cases to certain executive departments and to my Congressman and gotten nothing but sympathy.

It appears to me that a test case in the nature of a mandamus, or an injunction may be the only way to find out if we can't get the government to paying our bills again by the 10th of the month as they did in years gone by.

I would be interested in seeing some comments on this situation if anyone else believes it is serious.

John W. Johnson
President
John W. Johnson, Inc.,
Painting Contractor
Washington, D. C.

CALENDAR

Southeastern Association of State Highway officials, 16th Annual Meeting, Atlanta, Ga., Oct. 1-3.

Federation of Sewage & Industrial Wastes Associations, Hotel Statler, Boston, Mass., Oct. 7-10.

American Institute of Steel Construction, thirty-fifth annual meeting, Hotel del Coronado, Coronado, Calif., Oct. 7-10.

Society for Experimental Stress Analysis, annual meeting, Hotel El Cortez, San Diego, Calif., Oct. 9-11.

National Safety Congress and Exposition, Hotels Conrad Hilton, Congress, Morrison, La Salle and Hamilton, Chicago, Ill., Oct. 21-25.

Engineers' Council for Professional Development, Engineers Joint Council, joint annual general assembly, Hotel Statler, New York City, Oct. 24-25.

Hydraulics Conference and Annual Pacific Northwest Meeting, American Geographical Union, State College of Washington, Pullman, Wash., Oct. 28-31.

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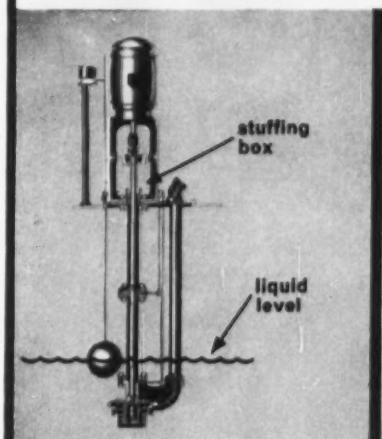

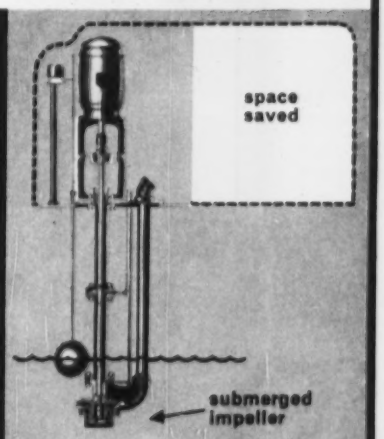

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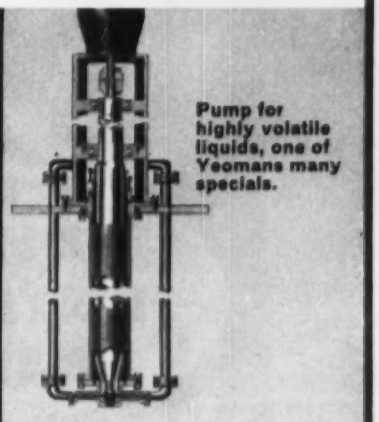

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ENGINEERING NEWS-RECORD

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THE CONSTRUCTION WEEK

EARLY START URGED—An effort toward obtaining authorization by next year for the proposed dam and reservoir at Tocks Island near the Delaware Water Gap, was urged by Francis A. Pitkin, chairman of the Interstate Commission on the Delaware River Basin, at its annual conference held at Mount Pocano, Pa., last week. Immediate objection came from Col. F. Clark, District Engineer, Philadelphia District, who said that the necessity for a special report on Tocks would delay and raise the cost of the Corps' present comprehensive study of the Delaware River, expected to be completed by fall, 1959. The dam would store over 600,000 acre-ft of water.

EXECUTIVE INSULT—When Wisconsin's Gov. Vernon Thomson last week signed into law a bill blocking construction of a building designed by Frank Lloyd Wright, Madison's Mayor Ivan Nestingen termed it ". . . an insult to Wisconsin's most renowned living citizen." (The famed architect is a Wisconsin native and maintains a home, office and school at Spring Green, Wis.) Estimated to cost $5.5 million, the building was to be the first stage of a $17 million lake shore civic center for Madison. But its design height of 60 ft would be illegal under the new law, which limits to 20 ft the height of structures built on the state-owned site, a filled-in portion of the bed of Lake Monona.

CONSTRUCTION SERIES?—Will it be heavy construction vs. light in baseball's World Series? Will it be Lou Perini's Milwaukee Braves against the New York Yankees, owned in part by builder Del Webb? There have been many "subway" series (both pennant winners and all series games in the same city). But this one looked to us at presstime Monday like a "construction" series, two contractors' teams matched for the world's championship—and a light vs. a heavy, at that.

WATER PLAN MOVES—California's Gov. Goodwin J. Knight has ordered start of land acquisition for the $229 million San Luis water project, key feature of plans to furnish to southern California water from the northern counties of origin. He said he had delayed site purchase for the dam and reservoir until federal and state responsibilities for the project could be worked out, but decided to go ahead because land values are increasing. The governor wants the federal government to build San Luis and let the state operate it, repaying the federal government out of project costs.

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WASHINGTON OBSERVER

- Trouble for small watersheds
- Political hassling on Seaway
- New look at grant-in-aid programs

● **Some new watershed projects of the Soil Conservation Service are in money trouble.** An impasse has developed between Crongress and the Budget Bureau over these federally aided local projects.

This is the situation: The Budget Bureau has bottled up eight projects that SCS and the Agriculture Department have approved—and that Congress wants to approve. Budget is taking the stand that local interests should bear part of the cost that results in "land enhancement"—increased value that accrues from having storage dams and related works in place.

Some Congressional Democrats are seething because the Small Watersheds Act provides for no such local payments. The Corps of Engineers, which builds flood-control works under different regulations, has to charge for land enhancement on its projects. And the Corps has entered objections to some of the small projects, on grounds that the rules for everybody ought to be alike.

Likely outcome: Congress will strengthen the Small Watersheds Act next year—and give Budget a rough time in the process. There is some sentiment for giving the Corps of Engineers the same liberal ground rules, but nothing is expected to come of that.

● **The White House plan to shift St. Lawrence Seaway from Defense Department to Commerce Department has blown up a Congressional storm.** Sen. Charles E. Potter and a number of his colleagues fear such a transfer would put toll rate and other policies under influence of eastern railroads that fought the Seaway from the start.

However, there's some support for the change, too. Sen. Alexander Wiley, who helped steer the Seaway act through Congress, favors it. So does administrator Lewis G. Castle of the Seaway Development Corp. One reason: The transfer would relieve Army Secretary Wilber M. Brucker from the necessity of making an embarrassing decision on who should operate and maintain the Seaway—the Corporation or the Corps of Engineers. By orders of Defense Secretary Charles E. Wilson, Mr. Brucker is wrestling with the problem. The trouble is, he wears two hats—one as head of the Army (and, therefore, the Corps), and another as supervisor and director of the Seaway Corp.

● **House investigators plan to give federal grant-in-aid programs a thorough going-over at hearings starting next Monday.** The House subcommittee on intergovernmental relations wants to hear from governors, mayors, county officials and state legislators.

The subcommittee wants to find out what, if anything, is wrong from the local viewpoint, and how responsibility and cost can be shared better on such programs as highways, airports, hospitals, housing, schools, colleges, urban renewal, water pollution control, and water resources development.

Rep. L. H. Fountain is chairman of the subcommittee, whose members include a number of active public works congressmen. Hearings open in Boston on Sept. 30 and Oct. 1. Other stops on the schedule: New York, Oct. 2, 3 and 4; Chicago, Oct. 16, 17 and 18; Kansas City, Oct. 21 and 22; Denver, Oct. 24 and 25; San Francisco, Oct. 28, 29 and 30; New Orleans, Nov. 18 and 19; Miami, Nov. 21 and 22; Raleigh, N. C., Dec. 10, 11 and 12.

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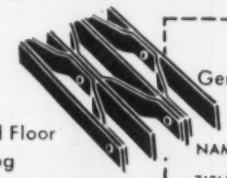

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In Boston last week, 700 attending the fourth in a series of highway engineering productivity conferences viewed the latest in photogrammetric techniques (right) and found out that electronic . . .

Computers Are Ready to Roll

The new look in highway design was rolling in high gear last week in Boston. It was not under a full head of steam yet, to be sure, but nearly 700 registrants at the latest in a series of highway engineering productivity conferences heard and saw evidence that electronic computers were producing solid results for a surprisingly large number of users.

At the last conference in Los Angeles in March (ENR Mar. 14, p. 21) about ten state highway departments and a handful of consulting engineers were past the gearing up stage for computer operation. A rough check last week in Boston indicated about 20 states and at least an equal number of consultants were starting to pay off their investment.

Moreover, 36 states now have computers on hand or on order compared to 26 in March. Many of the remaining states, mostly the smaller ones, give indication of relying on consultants and service organizations for electronic computation service. A comparable computer user figure for consulting engineers is hard to pin down, but a better indicator is the unchallenged opinion of several conference speakers that highway consultants will soon be forced out of business if they don't adopt high speed computation methods.

The other aspects of the new look in highway engineering, aerial photogrammetry and electronic linkages of photogrammetry and computers, also have registered remarkable gains in the past six months. Several states, indicative of a trend, reported they are entering into large-scale use of aerial photography and photogrammetry. Service organizations in these fields had no complaint about business. Demonstrations of M.I.T.'s digital terrain concept of highway location (see photo above and ENR Sept. 5, p. 97) impressed onlookers. The unveiling of the first commercial automatic line plotters (by two equipment makers) was a conference highlight. These machines will draw a straight line between two points, enabling reproduction without human intervention of highway cross sections, profiles and traverses directly from the output of electronic computers, or approximately equipped stereoscopic plotting machines.

• **Program pooling**—The three day conference came to grips with what is generally considered the toughest problem facing the prospective and neophyte computer user—development of programs, or sets of instructions, for the computer.

Basically, the difficulties are the relatively big expense and lengthy time required to prepare even a single program, the general inexperience of civil engineers with computers which adds to programming expense and time, and the limitations of program pooling arrangements. Last is due to divergent highway design practice and the major effort required to adapt a program prepared for one make of computer to another.

Cost and time of writing a program vary over a wide range, but it is not unusual for a computer user to spend $10,000 and four months on a single program. Half of the original preparation cost is an often cited requirement of adapting a program for use in another state, and even a greater effort percentagewise is frequently required going from one computer to another.

All these factors are retarding computer user progress and are making it difficult for the smaller agency, particularly cities and counties, to enter the field. It should be noted, however, that even large programming costs are amortized in a remarkably short time and that many users are overcoming programming difficulties.

Several approaches to alleviate the programming bottleneck were suggested last week. In a session on program development, a representative of the Service Bureau Corp., New York (a data processing organization recently divorced from IBM) asked for programmers to consider the needs of other potential users, to make the programs more general. He also commended the "building block" approach to program preparation: development of relatively simple subroutines which can

. . . User-maker conflict bared in Boston

be put together in various combinations. Lastly, he awakened a sleeping dog by criticizing what he thought were laggard pooling efforts.

This brought sharp rebuttal from H. A. Radzikowski, of the Bureau of Public Roads and prime mover of the new look in highway engineering, who pointed to progress of the BPR program library and clearly implied it was the computer manufacturers who should be contributing more to program preparation and interchange. The exchange triggered voluble expression in subsequent corridor talk by computer users of a long smouldering resentment of the lack of programming help from manufacturers. The criticism centered on the insufficient number of persons knowledgeable of highway needs employed by the makers (with specific reference to IBM because of its size and high penetration in the highway computer picture).

Broad perspective of the program pooling situation was given earlier in this session by Jerry L. Chang, of Richardson, Gordon & Associates and head of the Bendix computer users pooling group. He spelled out three levels of cooperation: Users in the same field with different computers can exchange approaches and input and output data; users in different fields with the same computer can share mathematical programs and coding systems (translation into computer language); users in the same field with the same computer can share completely coded programs.

• **Program accomplishment**—Programming difficulties notwithstanding, much significant and encouraging progress was reported in Boston. Washington State is processing 100 miles of earthwork a month on its computer and has 21 engineering programs in use. Among these are a Swedish slip-circle analysis of soil stability and a moment distribution for a 15 span continuous frame structure which also provides influence lines. Nebraska is doing similarly well, with 11 programs in use and 200 miles of earthwork computations under its belt, at a engineering saving of $90 per mile. Eighty miles of this have been put out to contract without plotted cross sections, but with computer-produced tabular information. Contractors were reported happy.

Mr. Chang's users group, on the same field-same computer basis, has been particularly successful with programs in structural design and geometry of bridges with 15 completed at this time. They include a camber calculation, composite beam design, cylindrical shell design, pier design and analysis of a fixed-end arch. Members include Parsons, Brinckerhoff, Hall and Macdonald; Vogt, Ivers, Seaman and Associates; Lockwood; Kessler and Bartlett, Inc.; Michigan Highway Department and the Illinois Division of Highways, whose earthwork computation program is receiving high praise and has already produced a saving of 36,000 cu yd of excavation over a 2 mile stretch of road in flat country by enabling trials of various alignments.

A series of programs concerning interchange geometrics was presented by Howard, Needles, Tammen and Bergendorff. The entire horizontal alignment of the extremely complex 14th Street Interchange in Kansas City was calculated entirely by computer, as was horizontal alignment, vertical curvature and superelevated decks of the Milwaukee Stadium Interchange.

• **Computer organization**—The conference produced an insight into the very important aspect of organizing a computer division. With certain exceptions, there was agreement among many speakers on this subject that a top notch highway engineer should be in charge with the programming group to include both highway engineers and mathematicians, with the former in heavier proportion. Actual data processing, it was held, should be passed through an engineer for priority and completeness, but handled by clerical personnel. The notable disserter, and the leading highway user of computers in terms of production volume, is California, where the computer division is manned entirely by non-highway personnel with engineers on call periodically for help in program preparation.

Georgia's C. A. Marmelstein cited his state's success with another arrangement—utilization of state engineers with programming experts of the Rich Computing Center at the University of Georgia under a contractual setup.

The opposite approach was commended by John Clarkeson, who heads a 250 man consulting organization. He advocated that computer users his size and smaller should have trained programming personnel, but that data processing should be performed at a commercial service center.

• **Photogrammetry progress**—In a photogrammetry session, Massachusetts and Maine reported on their recent extensive use of, and success with, photography and photogrammetry for route location and highway design. They concurred, along with long-time user Ohio, that obtaining cross section terrain data from spot stereoscopic viewing of photographs is superior to taking elevations off of a contour map.

The recently developed photo contour map was presented at this session by Aero Service Corp. Such a map is an orthographic projection showing both contours and complete air photo detail.

M.I.T.'s digital terrain model concept of route location was presented by Prof. C. L. Miller, D. R. Schurz and Prof. Saul Namyet in a conference session and at an exhibit. It involves procuring spot elevations over a complete 1,000 to 2,000 ft wide band of interest from aerial photos. Data are stored automatically, via some advanced instrumentation, on punched cards or other suitable input means for an electronic computer. The highway designer then specifies any number of trial alignments and profiles and an electronic computer produces earthwork quantities in rapid fire fashion.

• **Line plotters**—Enthusiastic groups of highway engineers gathered around the first two line plotters ever shown publicly. The equipment developers are the Benson-Lehner Corp., Los Angeles, and Electronic Associates, Inc., Long Beach, N. J.

The machines do virtually the same job—graphical representation of digital information—and are also in the same price range ($22,000). They are fed by punched cards, punched tape or keyboard. A pen attached to a moving head can travel over a 30 x 30 in. exposure of a paper roll. Lines are scribed at the rate of 40 to 60 per minute.

Rounding out the meeting's broad coverage were two panel sessions at which construction equipment manufacturers and highway contractors had their say. Both groups continued to drum home familiar themes: performance rather than method type specifications, a national certification of new equipment in lieu of arduous state by state approval, regional compaction specifications, faster payments by highway departments and less retainage during and at termination of contracts.

Easier listening for highway engineers was a lively discussion following the contractors' panel which indicated that most contractors will be happy to accept progress payments for earthwork based on planned quantities calculated by photogrammetry and computers, and will enthusiastically endorse final payments based on aerial photogrammetry if it means faster payments.

This fourth productivity conference was sponsored by the Massachusetts Department of Public Works, Massachusetts Institute of Technology, Association of Highway Officials of the North Atlantic States, American Association of State Highway Officials and the Bureau of Public Roads. Transcripts will be sent to registrants and are available by writing to H. A. Radzikowski at BPR in Washington.

Uniform Building Code Changed

Plastics covered for first time despite protests; lumber stresses cut 10% in two sets of standard grading rules

For the first time, plastics will be covered in a widely used building code—the Uniform Building Code of the International Conference of Building Officials. And some changes have been made in allowable lumber stresses with timber interests fighting a losing battle for higher loadings. These were the major actions taken by ICBO at its 35th Annual Meeting held in San Francisco this month.

The lumber stresses as adopted represent a 10% reduction of the allowable stresses from two sets of standard grading rules—Standard Grading and Dressing Rules No. 15 of the West Coast Lumbermen's Association and 1956 Grading Rules for Southern Pine of the Southern Pine Association. The moduli of elasticity in use in the code at the present time will continue in effect with certain minor exceptions.

The decision to reduce the allowable stresses was made in part because the recommended stresses are for "designs made and carried out under competent supervision and for lumber of assured grade." And since the recommended stresses were on the basis of a 10 year loading, design stresses for more permanent loading were obtained by the 10% reduction. The result will be more conservative design standards for timber construction.

A new table for non-stress graded lumber was incorporated into the code, which classifies it into usage groups according to strength and bending qualities. These tables have simplified and reduced the number of tables previously needed in dwelling construction design.

• **Plastics prove controversial**—Probably the most controversial of the changes approved at the meeting was that submitted by the plastics subcommittee, which incorporates a new chapter into the existing code.

The need for this type of legislation arose because of the tremendous number of plastics involved for consideration. The only apparent alternative to the enabling type legislation approved would have been to have an unwieldy code covering specific materials that would become outdated with the development of new materials. It was also felt that any initial mistake in such a code could prove more difficult to change than could one under the approved chapter.

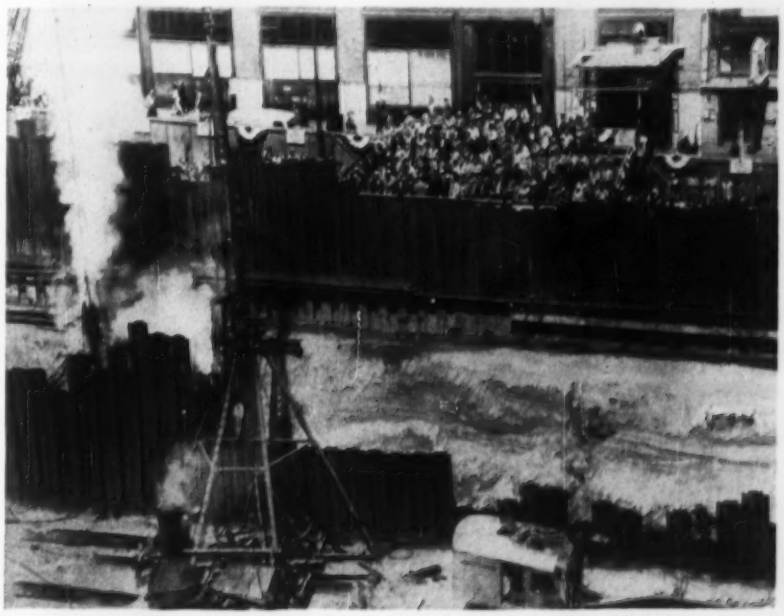
• **The con**—Fire officials and others opposed the proposal on the grounds that the ASTM rate-of-burning tests specified to be used had no significance as tests of building materials. They further argued that the fire and toxicity hazards of plastics in general were too great to incorporate them at this time into the code.

Still others felt that the changes offered little more than a series of exceptions to existing governing sections of the code. They believed the new chapter to be ambiguous in leaving out important engineering considerations such as allowable stress, factors of safety, etc. In short, they argued that insufficient information was available at the present time—the new chapter was too radical and needed a more conservative approach.

• **The pro**—The proponents of the plastics addition to the code stated that these criticisms were not justified since they were based on a misunderstanding of the purpose and effect of the new legislation. The new chapter was simply enabling legislation that would authorize building officials to approve specific plastics for limited uses. Any such approval would be based on evaluation of all the pertinent hazards.

While the ASTM tests were not intended as building material tests, their use would eliminate from consideration as a building material any of the so-called rapid burning plastics, according to the proponents. Also, the ASTM tests would assist the building officials in classifying plastics to establish maximum areas and minimum separation requirements. These tests would thus act as a limitation on the building officials' authority to approve plastics.

Finally, the proponents pointed out, flame spread as a criterion of fire hazard was not ignored but was made the basis for classifying plastics for use in a suspended ceiling system. Likewise, the code section dealing with conventional interior trim and finish will control that use of plastics. Any flame spread hazard will be dealt with by separation requirements, area limitations, exit requirements, occupancy restrictions, sprinkler requirements, etc. Since no satisfactory test for determining the rate of flame spread of a light-transmitting material has been developed, the flame spread test was not made the sole criterion.



This Job Has 2,001 Construction "Supers"

Sidewalk superintendents' clubs are not new, but few, if any, such organizations can boast a "club house." An exception is the officially established San Francisco Sidewalk Superintendents Club which has been provided with a 100 seat bleachers beside the site of the $10 million Crown Zellerback Building. Haas & Hayne Corp., in the interest of public relations, provided the bleachers and arranged for the City Supervisors to proclaim a "Sidewalk Superintendents Day."

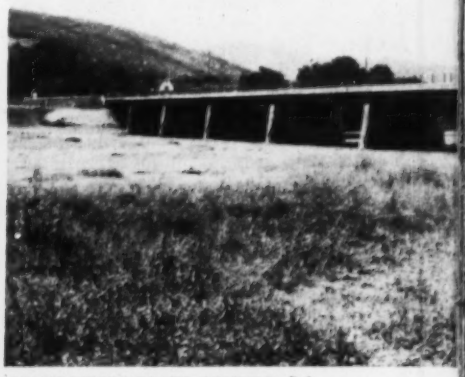
Mayor George Christopher officiated at the ribbon cutting for the "club house" and more than 2,000 people attending the ceremony were given charter member cards.

Nine U.S. Bridges Receive AISC Awards

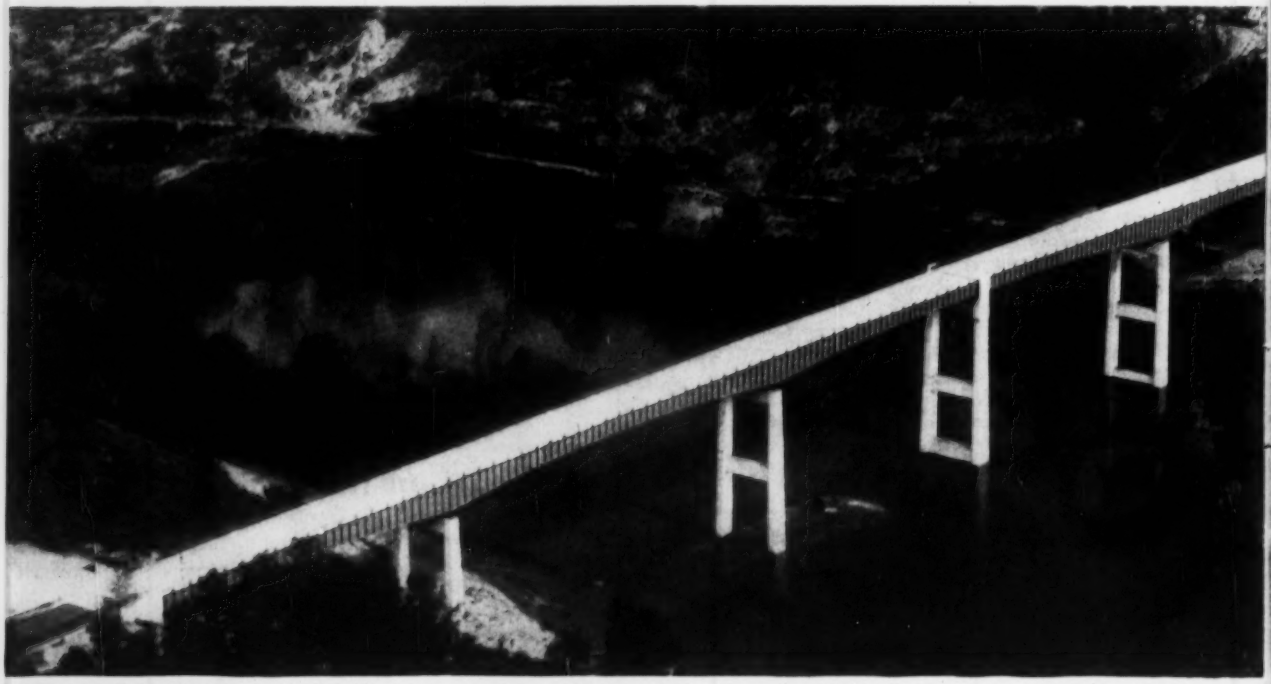
For the last 29 years, the American Institute of Steel Construction, Inc., has conducted an annual competition to determine the most beautiful bridges opened to traffic during the previous year. Here are six of the nine structures selected for citation by this year's jury.

The jury in this year's annual Aesthetic Bridge Competition praised the designers of all 70 entries for simple and direct solutions to bridge problems, for good proportion and excellent taste. For competition purposes, the structures are classified as follows: Class I, spans over 400 ft; Class II, with spans over 400 ft costing over $.5 million; Class III, with spans under 400 ft cost-

WINNER for bridges with spans under 400 ft, costing more than $.5 million is the Buffalo Bayou Bridge in Houston. Designer: Texas Highway Department.



ALLEGHENY RIVER BRIDGE, Salamanca, N. Y., was given first prize in the Class III



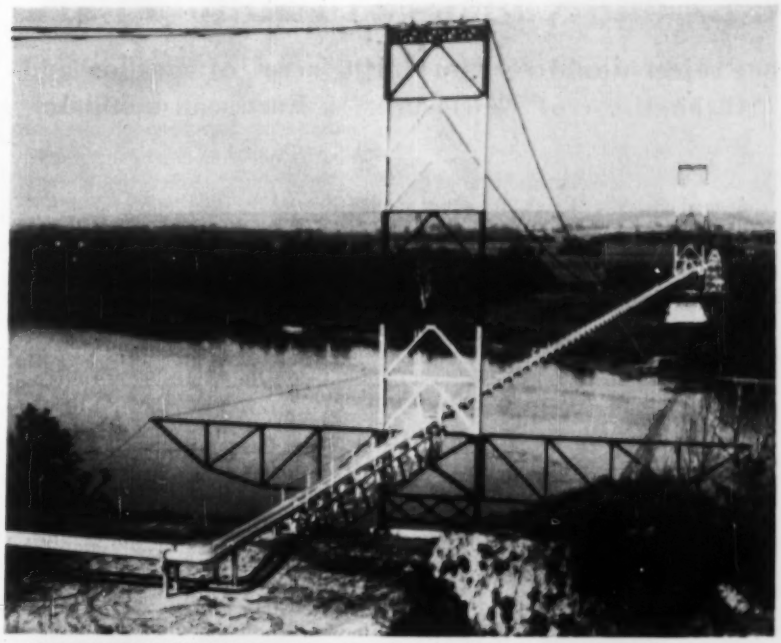
THOMPSON'S BRIDGE near Gainesville, Ga., received honorable mention in Class II. Owned by the Corps of Engineers, it

for Beauty

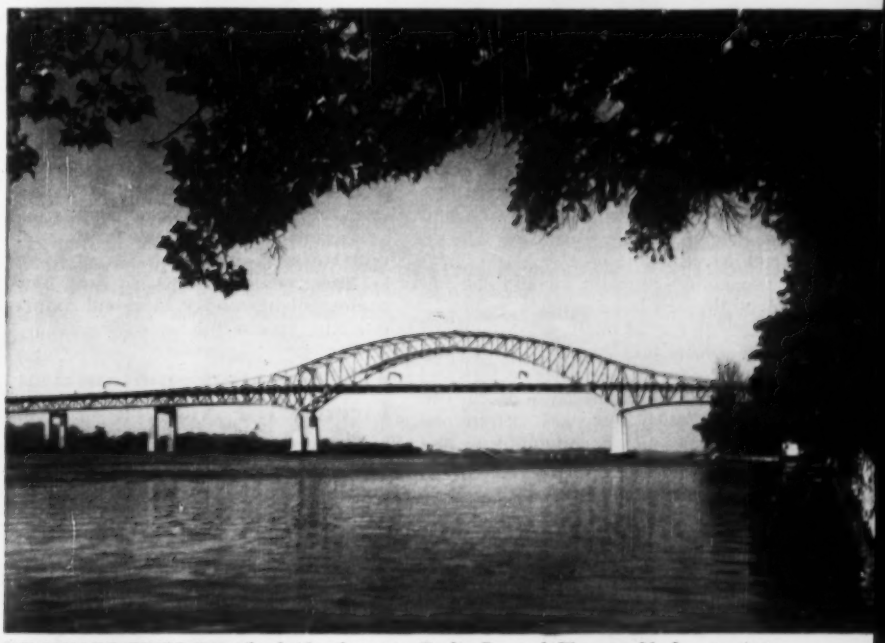
ing less than $.5 million. Three bridges not pictured which received honorable mention are: Corporal Joseph Thompson Memorial Bridge at Watertown, Mass., designed by C. J. Kray; Sidney Lanier Bridge near Brunswick, Ga., designed by Sverdrup & Parcel; and the Algiers Lock and Canal Bridge in New Orleans, designed by Howard, Needles, Tammen & Bergendoff.

competition. Structure was designed by N. Y. State Department of Public Works.

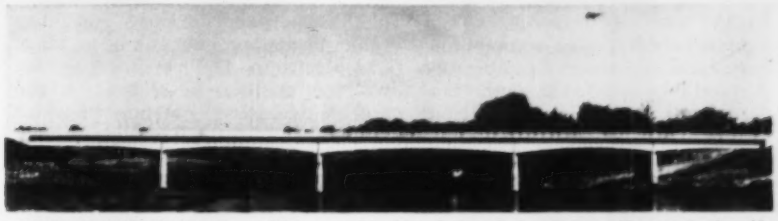
was designed by Patchen and Zimmerman.



"BEST OF THE SHOW" according to judges, the Missouri River pipeline suspension bridge was designed by Matthews and Kenan. Bridge is at Plattsmouth, Neb.



DELAWARE RIVER turnpike bridge between Egely, Pa. and Florence N. J. was given honorable mention in Class I. George S. Richardson was its designer.



GRASS RIVER BRIDGE at Massena, N. Y., designed by Praeger-Kavanagh for the Power Authority of New York, received honorable mention in Class II.

N. J. County Plans $14 Million Park

Project would reclaim 1,100 acres of meadowland through use of "enclosure," a European method

Plans for a 1,100 acre recreation park, to be the first major reclamation project of the northern New Jersey meadows, were disclosed last week by A. Carl Stelling Associates, site planning consultants.

Basic to the project would be the process of "enclosure," a technique that would lower the water level of the region by two feet, and perhaps save between $2 million and $3 million in landfill costs.

The park would be located in the southeastern corner of Bergen County, N. J., just west of the George Washington Bridge and would be one of the largest county parks in the nation.

Cost of the project is estimated between $12 and $14 million, according to Mr. Stelling. This includes $5 million for reclaiming land and initial development, and $9 million for constructing the park and its basic facilities. It is planned as a 10 year program.

The master plan for development of the area was prepared at the request of, and submitted to, the Bergen County Park Commission by the site planning firm. Its recommendations are the result of more than a year's study and research. Plans now require approval by the Park Commission and the Bergen County Board of Chosen Freeholders.

Financing probably would be arranged through bond issues.

"Our choice of engineering methods —a combination of lowering the groundwater level in the area by two feet and raising the land surface level by an average of two feet—was determined by considerations of economy, time and early use of the park," reported Mr. Stelling.

The plan involves the drying out and filling in of Overpeck Lake—a former tidal reach of a tributary to the Hackensack River—and the flat land which adjoins it.

Lowering the water level entails complete enclosure of the area to form a land basin from which water may be taken.

In the case of Overpeck, an enclosure already has been accomplished by recent construction of a combination bridge and tidal dam to the south of the park site. According to the Stelling report, the dam's automatic tide gates would effectively maintain the level of Overpeck Lake at a constant elevation on the park side and stop seawater invasion of the basin during periods of high tide.

The two-foot reduction of the groundwater level would reduce the required quantity of fill from approximately 7 million cu yd to 3 million cu yd, the report stated.

"Enclosure" is one of the oldest methods of land reclamation and has been successfully used in Holland, Italy and the Fens of England.

Raising of the land surface would be accomplished by a combination of sanitary landfill and hydraulic fill.

Plans for the park include a 280 acre fresh water lake, 50 tennis courts, nine baseball fields, three football fields, an ice and roller skating rink, a swimming pool, seven playgrounds, a concert grove, amphitheater and other recreational activities.

"In addition to providing a much needed recreation area, development of a park in this region will have several other important results," said Mr. Stelling. "Mosquito-breeding areas . . . will be eliminated, polluted streams will be cleared, flooding will be controlled, unsightly wasteland will be reclaimed, garbage will be usefully disposed of in sanitary land fill operations and land values in the area will benefit."

There have been other engineering proposals for such a project in earlier years, but none were so detailed.

Reclamation of the marsh areas of the Overpeck site and construction of facilities would proceed as funds are made available, and as local and county residents express their needs.

FPC Grants Conditional License for Niagara

The Federal Power Commission last Thursday granted New York State the long-delayed license for the $600 million Niagara Power Project. But the conditional nature of the license may cause still more delay in start of construction.

One of the conditions set down by the FPC is that the Power Authority of the State of New York—which will build and finance the project through bond issues—must submit within six months revised drawings, including those of the project's water conduits and reservoir. The commission then will pass on the type of conduits and area of the reservoir, features of which the local municipalities of Niagara Falls, Lewiston and Niagara County have protested. FPC will hold public hearings starting Oct. 1.

Robert Moses, chairman of PASNY, has been against a conditional license, holding that the possibility of changes keeps the project cost in doubt and would therefore delay financing.

• **$1 million advance**—Two days before issuance of the license, New York State Gov. Averell Harriman and legislative leaders approved an emergency authorization that gave PASNY $1 million to continue work on the project's hydroelectric plant.

The money will be used for continuation of design work, field surveys, boring contracts and purchases of steel in advance of construction.

Community Effort

Development puts in its own sewage treatment

Summit Hills Heights, Kenton County, Ky., has demonstrated how a small community can treat its own sewage—and with minimum expense.

The 300 family development is almost three miles away from where the nearest sanitation district trunk sewer line is scheduled to pass, ruling out a tie-in to it. Also, Kenton County soil is not considered fit for septic tank operation. The community therefore decided on permanent treatment facilities to replace temporary treatment tanks.

First step was formation of a nonprofit organization—Summit Hills Heights Sanitation Corp.—to construct a sewage system. A sanitation committee also was formed to guide operations. Plans were drawn up by the city engineer of another Kentucky city, submitted to the state for approval, and the contract was let to Frank Busch; who had been builder of the development.

At a cost of $65,000, treatment facilities—patterned on the Cavitator System —were installed and over 2,500 ft of trunk sewer line put in. The simple plant needs no maintenance personnel, only someone to oil the machinery every so often.

Flood Control Project Faces Water Shortage

A Corps of Engineer flood control project on the Blackstone River may be delayed because of a water shortage in Woonsocket, R. I.

The project required diversion of the river, making it necessary for a number of factories that use river water to tap the city's dwindling water supply. With the supply dropping at a rate that threatens a drought in 60 days, Aurius Precourt, city public works commissioner, said it may be necessary to ask for a slowdown on the flood control project so that the factories may continue to use river water.

Diamond Jubilee

New England Water Works Assn. marks 75th year

The "forward look" amid much reminiscing marked the 75th annual convention of the New England Water Works Association last week in Boston.

One looker-ahead was Morris M. Cohn, editorial director of "Water Works Engineering," who suggested ways waterworks operators could obtain "value" as well as "price" in purchase of equipment. He noted that of an estimated $22 billion expenditure in water system facilities to meet forecasted needs through 1975, about half would have to be spent on equipment.

Mr. Cohn would remove many restrictive regulations on public purchasing in recognition of the generally high integrity of today's public officials; improve equipment specifications by municipal agencies to aid them in obtaining the right equipment at the lowest price; enlist greater aid from reputable manufacturers by municipalities in preparation of specifications.

• **75th year**—The reminiscing at Boston was carried out in the best tradition. R. S. Rankin of Stamford, Conn. began with a review of waterworks equipment from the very beginning. E. Sherman Chase paid tribute to the great water engineers of the past and present. And an all-morning panel of the six chief sanitary engineers of the New England states spoke of waterworks and public health progress over the past 75 years. In sum, the reminiscing provided considerable perspective for the convention attendees, who numbered about 735, including wives.

George G. Brogen, of Weston & Sampson, Boston, assumed the presidency of NEWWA at the convention.

• **Modern plant**—A strikingly different water treatment plant—a 3.5 mgd works in Billerica, Mass.—was described by its noted designer, Thomas R. Camp of Boston. It provides a choice of treatment methods to accommodate relatively polluted river water or well water, both containing troublesome amounts of iron and manganese.

Conventional coagulant and sedimentation facilities were constructed for coagulation at low pH (6.5) with alum flocculant in conjunction with breakpoint chlorination. But tests of well water indicated better iron and managanese removal by coagulation at a pH of 10, using an iron salt (ferric chloride) as flocculant and sodium hydroxide rather than lime as the alkali to raise pH. A chlorination contact chamber, providing 18 minutes detention, was constructed ahead of the flocculation bays. This gives time for a bacteria kill before pH is raised for high pH coagulation.

Rapid sand filters at the Billerica plant have 18 in. of anthracite coal atop the sand to encourage penetration of floc into the filter bed to allow longer filter runs. In over a year's operation, filter runs have averaged 104 hours, with filter input rate averaging about 3 gpm per sq ft of filter area.

Mr. Camp rated the filter at 3.4 gpm per sq ft and based plant hydraulics on this figure. This is somewhat higher than is usual currently, although several plants have gone higher, notably Chicago's Central District Works, which will be rated at 3.75 gpm.

Other unusual features at Billerica include porous plate filter bottoms of alumina, equipped with acid wash pipes, two-story sedimentation with the same sludge collection apparatus serving both decks and stationary flocculation blades in conjunction with tapered (in effect) rotating paddles.

Will the Rains Come?

Bridge to be suspended during hurricane season

Over protests of the Mississippi River Bridge Authority, Bethlehem Steel Co. has announced that it will stop work on the central span of the $65 million bridge at New Orleans during the hurricane season.

The steel company has cited a provision in its contract with the authority providing that no hazardous work may be scheduled during the hurricane season. The company had first announced that it would suspend work on the span from Sept. 1 to Dec. 1, but construction progress was such that erection had to be continued.

As matters now stand, Bethlehem anticipates a cessation of work from Oct. 15 until Dec. 1.

In protesting the stoppage, Capt. Neville Levy, chairman of the Bridge Authority, said that there never has been a hurricane in the New Orleans area after Oct. 15 of any year. He also said the authority will ask the courts if Bethlehem is entitled to an extension of time because of the stoppage.

If the stoppage is deemed unreasonable by the courts, then, according to Capt. Levy, Bethlehem will be required to pay liquidated damages of $3,000 per day for each day of construction beyond Dec. 25 of this year.

The New Orleans City Council is attempting to meet with representatives of the authority and the steel company. The council's concern lies in the fact that interest on the bonded indebtedness for the bridge project is accruing at $6,455 per day.

Industry's Engineers

Opinion research pollsters find them happy

"Career Satisfaction of Professional Engineers in Industry" has been published as a research survey for the Professional Engineers Conference Board for Industry in cooperation with the National Society of Professional Engineers. Opinion Research Corp. of Princeton, N. J., conducted the poll.

The 84 page report says engineers in industry want a job that is a challenge and related to their talents, one that has advancement opportunities and adequate financial reward.

In total, the impression left by this report is that engineers in industry no longer feel "frustrated," as they were widely reported to be but a few years ago.

They want greater professional recognition, and want to be kept informed. And they appreciate non-financial rewards such as credit for their work, recognition of their ideas, and a perspective of their part in their firm's "big picture."

Significantly, roughly half of the 265 engineers interviewed said they would leave engineering for a management post—even if the rewards in engineering were to be made equal.

Those interviewed were grouped in three career stages: Early (3-6 years experience), mid-career (10-15 years experience), and late (20-25 years). They represented aircraft, automobile, chemical, electronics, electrical machinery, heavy equipment, petroleum refining and rubber industries. All firms represented are among the nation's top 200 in size, and all individuals interviewed were graduate engineers.

Median salaries for the three experience groups were respectively $7,500, $10,000 and $12,000 per year.

Among those interviewed, participation in professional societies was found to be the exception rather than the rule. Civic activities, too, were found the pleasure of a minority.

Basically, industry's engineers were found to be glad they became engineers; they said there is ample advancement opportunity ahead; they have some reservations about their schooling (76% of the more experienced found some deficiency); two-thirds of them said they have their eyes on a better job, and as many expect advancement in the next five years.

About two-thirds think there is ample opportunity within engineering in their firms, yet half of those interviewed (51%, 49% and 49% respectively for the three experience groups) would prefer to direct their careers out of engineering and into management.

Lightweight Fruehauf Airslide* Provide Bigger Roadbuilding

Davis Cartage and Equipment Company of Carrollton, Michigan, finds that lightweight Fruehauf Airslide* Bulk Cement Transports cut unloading time drastically. In operation they build customer good will because they provide faster delivery service and greater efficiency.

These units build profits for their operators, too. A typical example is the 15-mile widening project on highway M-78 between Lansing and Battle Creek, Michigan, where Davis realized payload increases of 20 barrels of cement for each of its Airslide Bulk Cement trains. So successful has this equipment proven to be that Davis now operates 20 Fruehauf Airslide Bulk Cement Transports for state-wide deliveries to highway and bridge projects and to ready-mix and cement block plants.

Such engineering features as the Airslide Transport's single point outlet, and its discharge rate of 10 to 15 barrels a minute, make it a highly efficient method of handling bulk cement. If you are in the roadbuilding business, it will pay you to investigate the *complete* line of Fruehauf roadbuilding units which also includes dumps, platforms, carryalls, and screw type cement tanks. Completion dates on your projects depend on durable, dependable equipment. Let Fruehauf equipment help you keep these dates faithfully.

*Airslide—Trademark, Fuller Company

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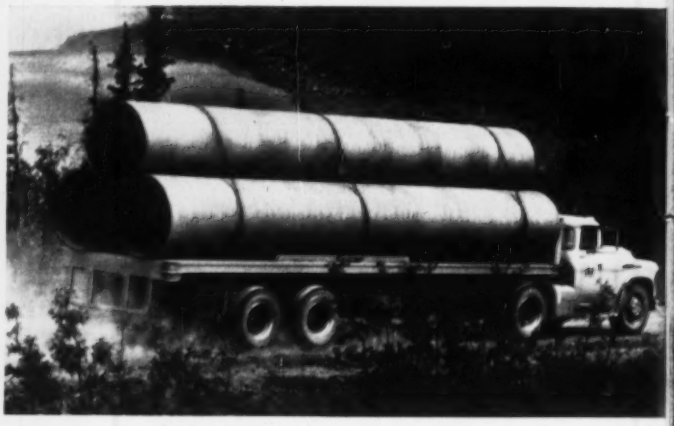

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X-SHAPED APARTMENT BUILDINGS house 120 student families at Montana State University. Exposed concrete framing adds to economy and architectural treatment of the structure.

Exposed Precast Bents Frame Apartments

TRUCK CRANE LIFTS 28 ft high precast bent. Steel strongback lifting arrangement was specified in plans to provide bidding uniformity.

Precast concrete bents, three stories high, form the framing for two student apartment buildings at Montana State University in Missoula, Mont. The precast members are exposed at the exterior of the structure for effective architectural treatment as well as for economy of construction.

Each of the buildings occupies an entire city block. The structures are X-shaped, with major dimension of 360 ft from end to end.

• **Bent dimensions**—The 3 story bents are 28 ft high. Width is 36 ft from tip to tip of the cantilever overhang. Width inside of columns is 24 ft, to permit use of 4 ft wide plywood sheets in forming the floor slab. Bent thickness is 10 in., the columns tapering from 14 in. at the top to 18 in. at the bottom.

Floor beams between columns are 18 in. deep. Spacing is on 10 ft centers; the tight arrangement is dictated by architectural layout.

The bents were designed for a 40 psf roof live load and a floor load of 60 psf, including 40 psf live load and 20 psf equivalent partition load.

A total of 144 bents were required on the job; all were identical to simplify construction operations. The contractor—C. B. Launch of Great Falls—used six sets of forms and cast the bents six deep. Concrete strength of 3,750 psi was specified; the bents were lifted after testing showed the concrete had reached a strength of 2,500 psf.

• **Lifting arrangement**—To promote uniformity in bidding the work and to protect the concrete units from possible mishandling, the structural engineer—Jack M. Lyerla of Spokane, Wash.—specified the lifting arrangement. Lifting inserts were placed at the location of each longitudinal beam. Bolted to the inserts were pairs of 10 in. junior channels that formed the lifting strongback. Using two-point pickup on each strongback, a 30 ton crane positioned the 15 ton bents taking about 40 min to place each unit.

The bents had steel base plates cast into them to make foundation connections simple.

The lifting inserts served double duty. After erection of each bent and removal of the strongback, No. 8 reinforcing bars were welded to the bolts to serve as ties between adjacent bents.

• **Wall construction**—Interior partitions are concrete block. End walls are made of brick. The side exterior walls are precast panels. These 4 in. panels were cast on the floor slab by placing pumice concrete on asbestos-cement-insulated board. The wall units could be lifted without mechanical aids. The asbestos-

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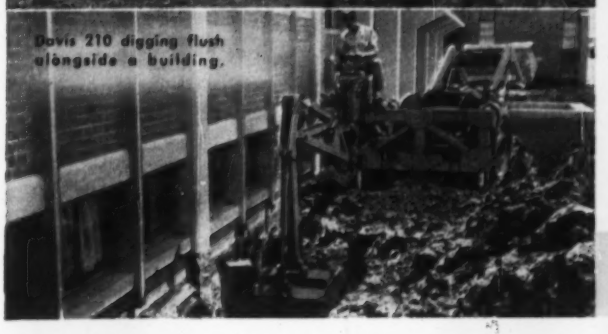

Davis 210 digging flush alongside a building.

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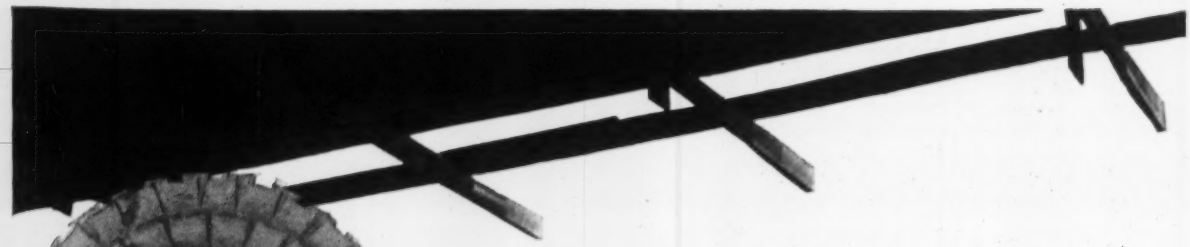

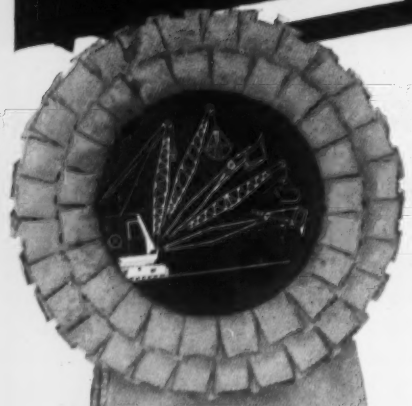

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. . . with Socony Mobil's new Contractor PM System and expert engineering service!

If improper lubrication is causing your equipment to break down prematurely, Socony Mobil's new simplified Contractor PM System and famous engineering service can help prevent it. This comprehensive service includes analysis of equipment condition, advice on inspection and lubrication periods by experienced engineers—all backed by Socony Mobil's vast research facilities and technical know-how. In addition, Socony Mobil's Correct Lubrication Program also includes:

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1. Record Folder—provides identifying data for each piece of equipment, holds equipment records.
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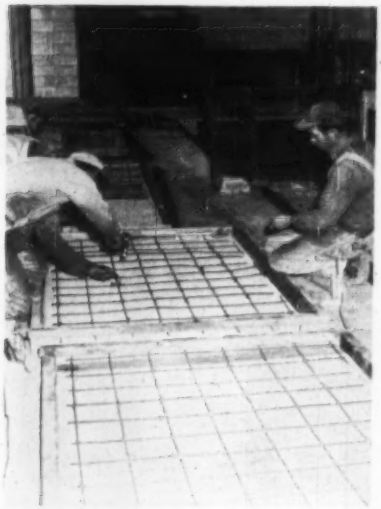


WALL PANELS are cast on apartment floors. Pumice concrete on asbestos-cement insulation board serves as exterior walls, at $1 per sq ft.

PANELS ARE POSITIONED by workmen without use of mechanical lifting. Exterior was left unpainted except for silicone waterproofing.

cement board serves as interior wall finish.

The lightweight concrete on the exterior was left unpainted, except for silicone waterproofing. Cost of the exterior walls proved to be about $1 per sq ft.

The contractor claimed a saving due to the bent design of about $80,000 in the structural framing over conventional cast-in-place concrete. Total cost of the two apartment buildings was about $1¼ million.

Architects on the job were Witwer & Price of Missoula.

Jungle Busters

by R. G. LeTOURNEAU

The pioneering spirit is still strong in America—or if it isn't it should be, because there's still lots to be gained from opportunities all around us today.

For instance, even today there are millions and millions of acres of wooded wilderness—land which has been almost too tough to clear, which still defies civilization. A great deal of this land is rich in natural treasures and rich in promise. But there it lies, unused.

In these jungle areas you will find fertile soil for farming, rich deposits of minerals, good land for grazing, fine forests for timber and plenty of space for new industries—all blocked by impassable vegetation.

So there's one thing that a man *must* have to conquer this wilderness, and that's ACCESS. And the only way he will get the access he needs is by machines made specifically for the job. In other words, machines that are as BIG as the jobs they are going to have to do.

This problem became a reality for us when we were called on to provide machinery to clear thousands of acres of jungle land in a hurry in Peru and Liberia, for roadbuilding and agricultural projects. Of course, in order to clear off big chunks as fast and as cheaply as possible, we had to design and build some revolutionary new machines. What we developed is a "team" we call *Jungle Busters*.

Take the Tree Crusher for example. It's a real monster of a machine weighing 140 tons that pushes over everything in its path, including trees 3 and 4 feet in diameter. It rolls right over the trunk, splits it open, breaks off the branches, and leaves everything matted on the ground for easy burning. It travels plenty fast for the job, cutting big swaths through the jungle 20 feet wide.

And for the really big boys—trees six or eight feet in diameter, we've got the Tree Stinger that can walk right up to one of them, give it a 250,000-pound shove—and over it goes, roots and all. We've *yet* to find a tree the Stinger can't push over.

Then, too, we've developed a big 50-ton Disc Plow to come in and finish up the job. It has discs 6 feet tall and it plows a path 16 feet wide. This one's made to break new land, stumps and all, and on a really tough job it will plow from two to three acres in an hour.

So you can see that this Jungle Buster team can clear land at a rate never before dreamed of. And land clearing is only one of the fields we're interested in. We also are making specialized equipment for some other tough jobs—like off-shore drilling, heavy logging, off-road hauling, heavy materials-handling, and a few others. But we'll be talking about those later. In the meantime if you'd like to talk to us about problems that need a BIG answer, we would like to hear from you.

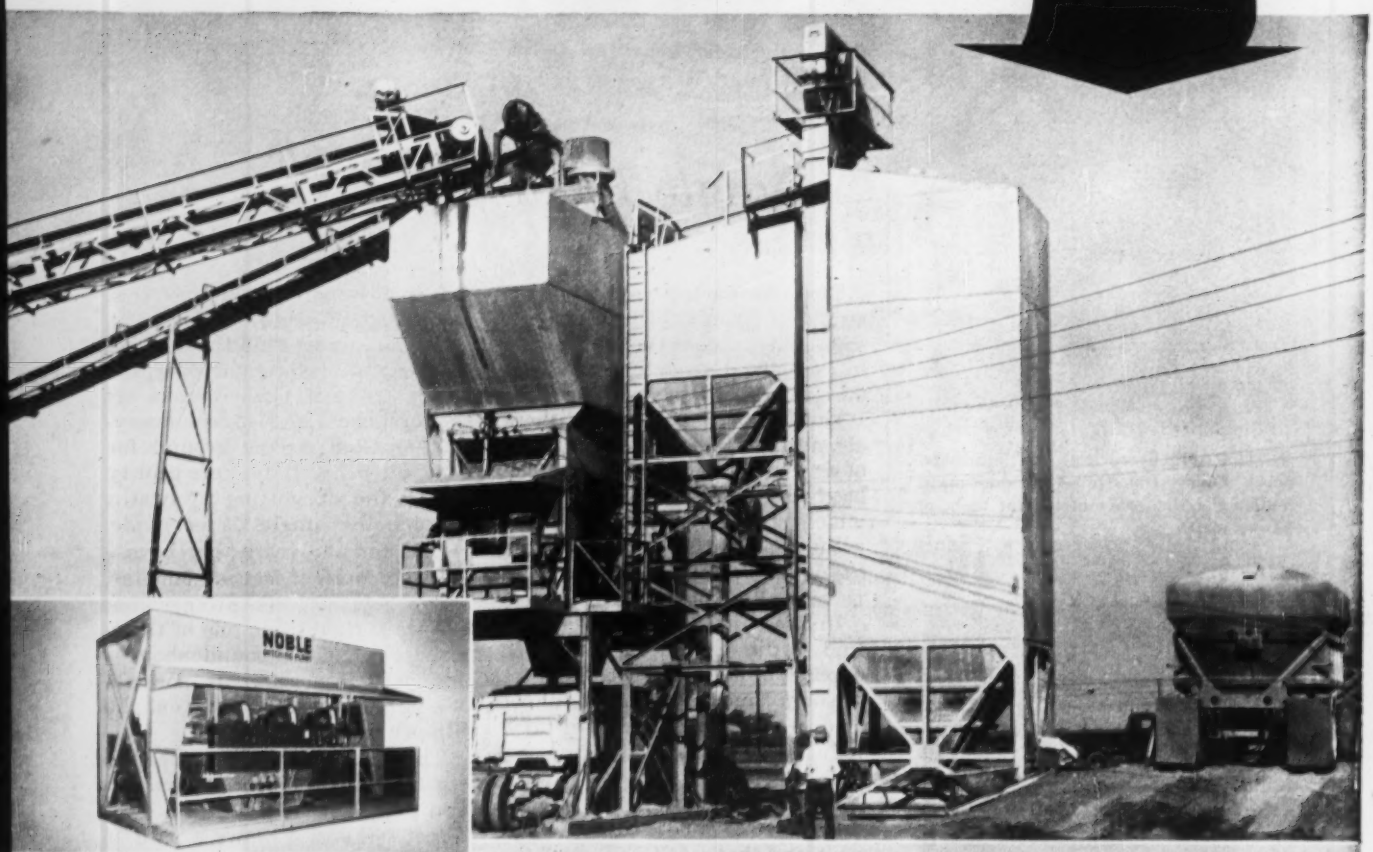
R. G. LeTourneau

R-101

R. G. LETOURNEAU INC

27210 SOUTH MAC ARTHUR • LONGVIEW, TEXAS

NOBLE TRIPLE BATCHER produces one operator in 1 stop or



Bin center section can be truck-hauled without removing weigh hoppers, operator controls or any other components. All electrical switches are mounted in this unit and connections are made by simple twist-lock couplings.

3 pen recorder, optional equipment, produces record of each material as required by Corps of Engineers specifications. Adaptable to 1 or 2 stop set-up.

✓ **Weighs 3 materials for a single batch at one time!** *(sand, coarse aggregates, cement)*

✓ **Batches accurately to rigid specifications!**

✓ **Supplies 2 or 3 dual drum pavers!**

Lowest erection costs. Noble comes completely equipped ready for batching. Factory assembled sections, all within legal width for highway transport, are quickly erected on timbers or concrete.

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over 300 yards per hour with 2 stop set-up

PORTABLE!
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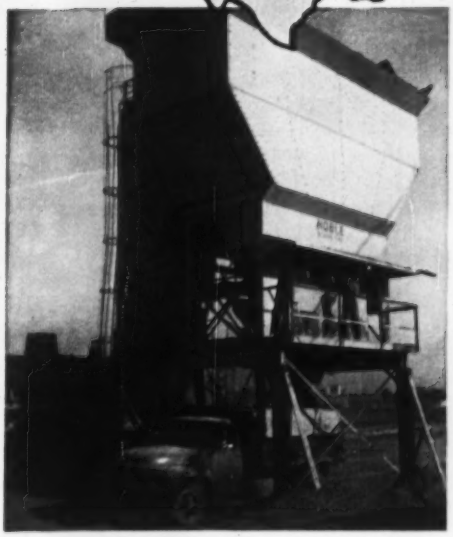
MEASURES 8' x 10'6" x 36'

FROM COAST TO COAST

Left—Supplying 3 pavers on California air base construction. Produced 3500 cubic yards in 10 hour period. 36" coarse aggregate conveyor, 24" sand conveyor. Cement silo has facilities for direct loading of cement spreader trucks.

Below—On New England paving job.



For short stretch paving, come back work, tunnels, bridges, use...

NOBLE-MOBILE Batching Plant on Wheels

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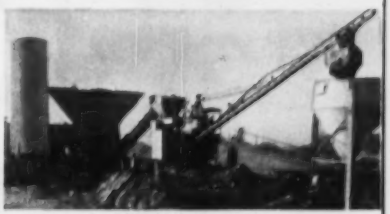
Bureau of Reclamation siphon, Othello, Wash.



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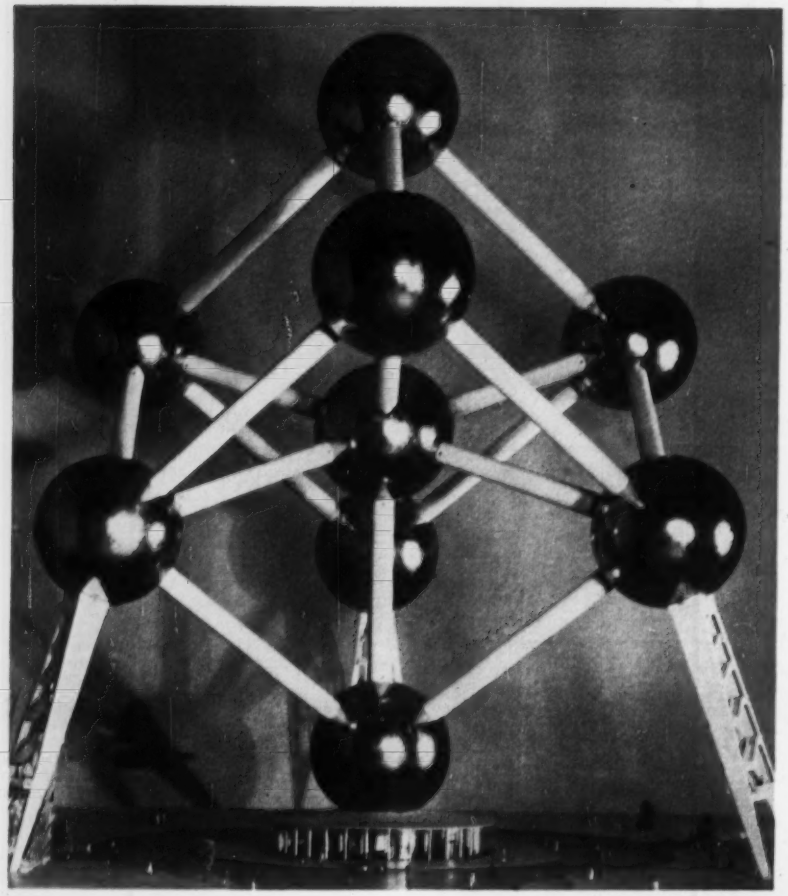


Brussels landmark next year will be an atomic model 360 ft high, a correct indication that the . . .

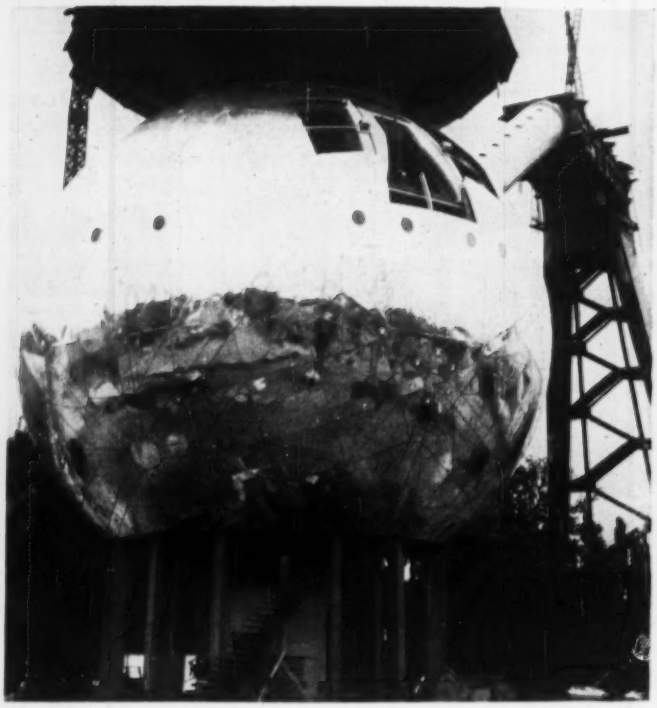
1958 World's

Waldo Bowman, Editor
Engineering News-Record

It won't be ready for visitors until April, 1958, but already the site of the Brussels World's Fair is alive with architects, engineers and some 7,000 craftsmen from a dozen different countries creating the most arresting structural engineering show of the century. Some of it borders on the bizarre—the pavilion of the Belgian province of Brabant, for example, is being made to look like a glowing mushroom at night—but most of the structures reflect an attempt toward solid achievement in new structural expressions.

Compared with previous world's fairs, too, the structures at Brussels are of a more permanent type, even though almost all of them must be removed when the fair ends. Excepted from this removal requirement are the "palaces" erected for the 1935 Brussels Exhibition, which are being enlarged and modernized for one of the main entrances

SPHERE AND SHAFT mark the beginning of construction of the 360 ft high Atomium, shown as model at the top of the page.



SPHERE 59 ft dia, has steel walls inside, aluminum outside. Six spheres will house exhibits and a restaurant.

Fair Is a Structural Show

On-the-spot Report

Waldo G. Bowman, editor of ENR, covered construction of the Brussels World's Fair structures as his first stop on a current European-Middle Eastern trip that has him in Baghdad, Iraq, this week. In the next of several articles to follow, Waldo Bowman reports on Turkey's move to hydro power. Watch for it.

to this fair. And contrary to the normally permanent nature of most of the buildings will be those in a 12 acre replica of a Belgian village of the 1900's, which will be done in wood, stucco and plaster.

Generalization concerning so many structures of diverse types is difficult, but a rather extensive use of cables to support roofs is to be noted. There is also wide use of thin-shell concrete and a number of noteworthy applications of structural welding, prestressed concrete, laminated timber, and aluminum. And unprecedented expanses of plastics and glass are achieving effects of light weight and airiness in the buildings.

Outstanding, and worthy of special description in this brief account, are the U.S. pavilion, which has a cable supported roof, likened to a bicycle wheel with hub, rim and spokes; the French pavilion, in which a structural system acting like a balanced lever will automatically tension a network of cables forming the surface of a double hyperbolic paraboloid roof; the civil-engineering pavilion of the Belgian Ministry of Public Works, which is a counterweighted arrow in thin-shell concrete cantilevering 237 ft from its support; and, lastly, the theme structure of the fair, called the Atomium, in which welded steel spheres 59 ft in diameter are disposed in space to a total height of 360 ft on cylindrical struts, to represent nine atoms in a crystal of iron (ENR Feb. 21, p. 234).

• **The site**—The location of this structural show is Heysel Park, a wooded area on a hill in the northern outskirts of the city adjacent to Laeken Palace, home of the Belgian king. Traversing a part of the site is a tunnel 1,500 ft long, 23 ft wide and 17 ft high, built as a hobby by a former king and now reconstructed for the use of the trolley line from the city. This tunnel complicated the location of the footings for some of the buildings, but otherwise the foundation construction was easy in a sandy clay soil.

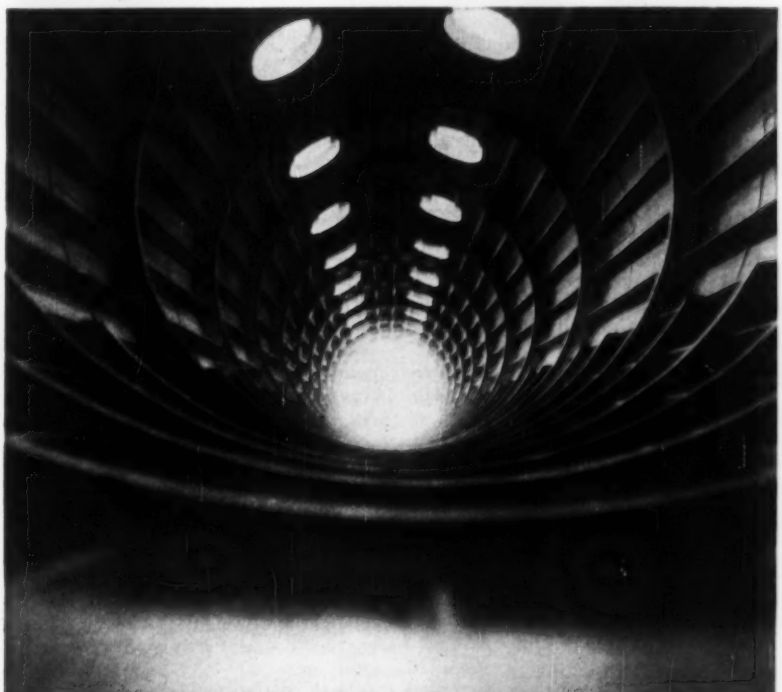
A practical feature of the site is its restriction to an area of 450 acres—in contrast to the 1,000 acres in the New York World's Fair—so that visitors will not be physically exhausted by their sightseeing. Near the site too, an extensive array of motels has been constructed, and nine different gateways have been provided, with adjoining parking areas totaling 20 acres.

• **Construction in Brussels**—With the fair a definite national objective since 1954, long needed projects of both private and public nature have been undertaken in the city and its suburbs. Whereas a housing shortage existed five years ago, there is now said to be an excess of modern apartments. Many new high-type single-family houses in the luxury class also have been built releasing older homes for rent and sale, and construction of this type is still progressing.

But it is in the field of public works, and particularly transportation, that the most noticeable transformation has occurred. Brussels is a city addicted to street cars, and like all old cities has a preponderance of narrow streets. The combination is not conducive to the efficient movement of motor vehicles, especially across the central part of the city. Fortunately the city had available a wide right-of-way for a ring road around this central area in the space formerly occupied by wall fortifications. Streets ran along this area, but the roadway surfaces were worn and narrow and also accommodated the trolley tracks.

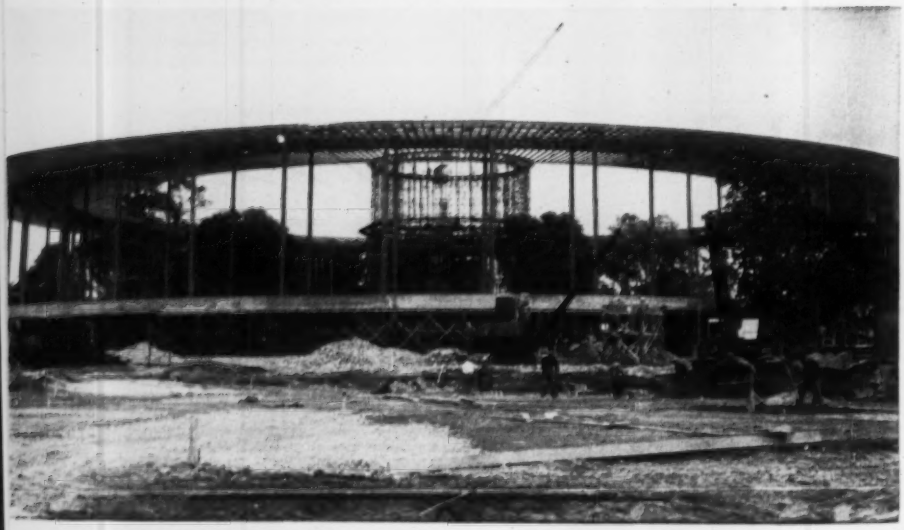
The solution has been to put the tracks in a right-of-way of their own, separated by a mall or trees from a wide, modern expressway, with underpasses at the important intersections. Where sufficient space is not available, the ring road is being put in a tunnel or on an overhead viaduct. Since, under these circumstances, the existing surface street can often be modernized and kept in service, the end result is that the traffic capacity is more than doubled.

At one location the highway is being elevated for nearly a mile. Here a structure on a single line of columns is being utilized, carrying a 39 ft wide deck for three lanes of motor vehicles. The trol-

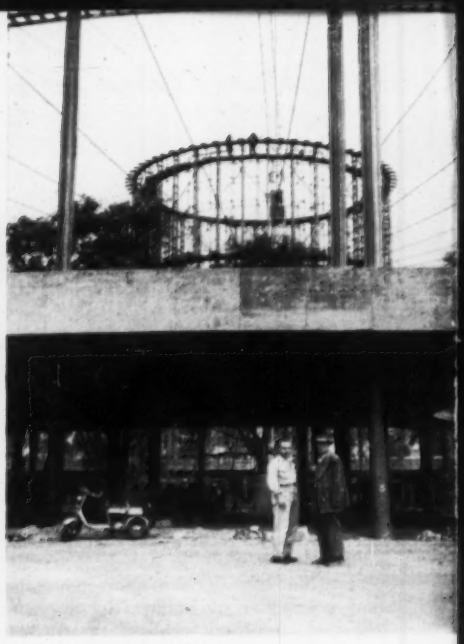


INCLINED SHAFT, 10 ft in dia, is typical of the tubes joining the spheres of the Atomium. This one will house an escalator.

. . . U. S. Pavilion will be a star attraction



CIRCULAR BUILDING is U. S. Pavilion, a 342 ft "bicycle wheel," with a cable-suspended plastic roof. The double row of perimeter columns supports entire building.



CYLINDRICAL HUB was erected on falsework, which was removed later.

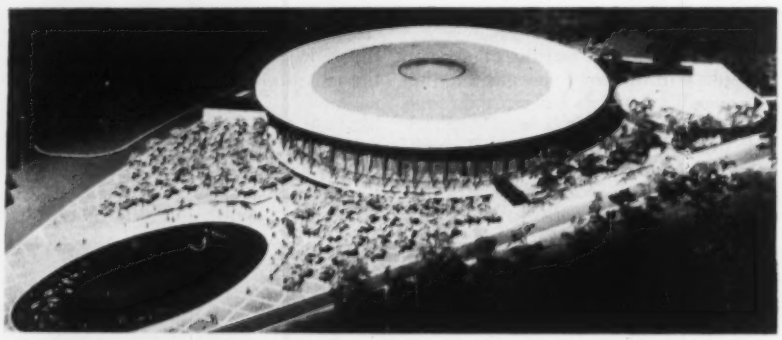
ley tracks are placed under the overhangs of this roadway, and there is a four-lane surface road both sides of the tracks. Where tunnels are used (principally at street intersections), cut-and-cover type construction is being employed. At one crossing, tunnels are built under both of the intersecting streets, one above the other. In addition, an underground connection is provided between these tunnels so that heavy suburban traffic, which comes to town in the lower tunnel, can turn off into the upper tunnel, which carries the ring road. This connecting tunnel cannot, however, be used for outbound traffic since clearance for a complete grade separation underground was not available.

In addition to this inner belt road, work is also proceeding on an outer belt, which touches the world's fair site and thus can be useful for all traffic coming in over the rural highway system.

The whole highway modernization scheme has a price tag of about $40 million.

It should be noted also that the way was cleared for this street work in the downtown section several years ago when the surface railroad tracks joining the city's north and south stations were put in a tunnel. Part of this work was also the construction of a central station between the two. A number of modern office buildings have also been built in the areas released by this underground railroad development.

• **Theme structure**—All in all, there is ample evidence that Brussels will be in good condition to handle the influx of visitors—estimated to reach a half million on special days—expected for its world's fair. And there will be no mistaking the location of the exposition, for its hilltop site will be marked from almost any point in the city by its unique theme structure, the Atomium, which will rise above everything on the horizon.



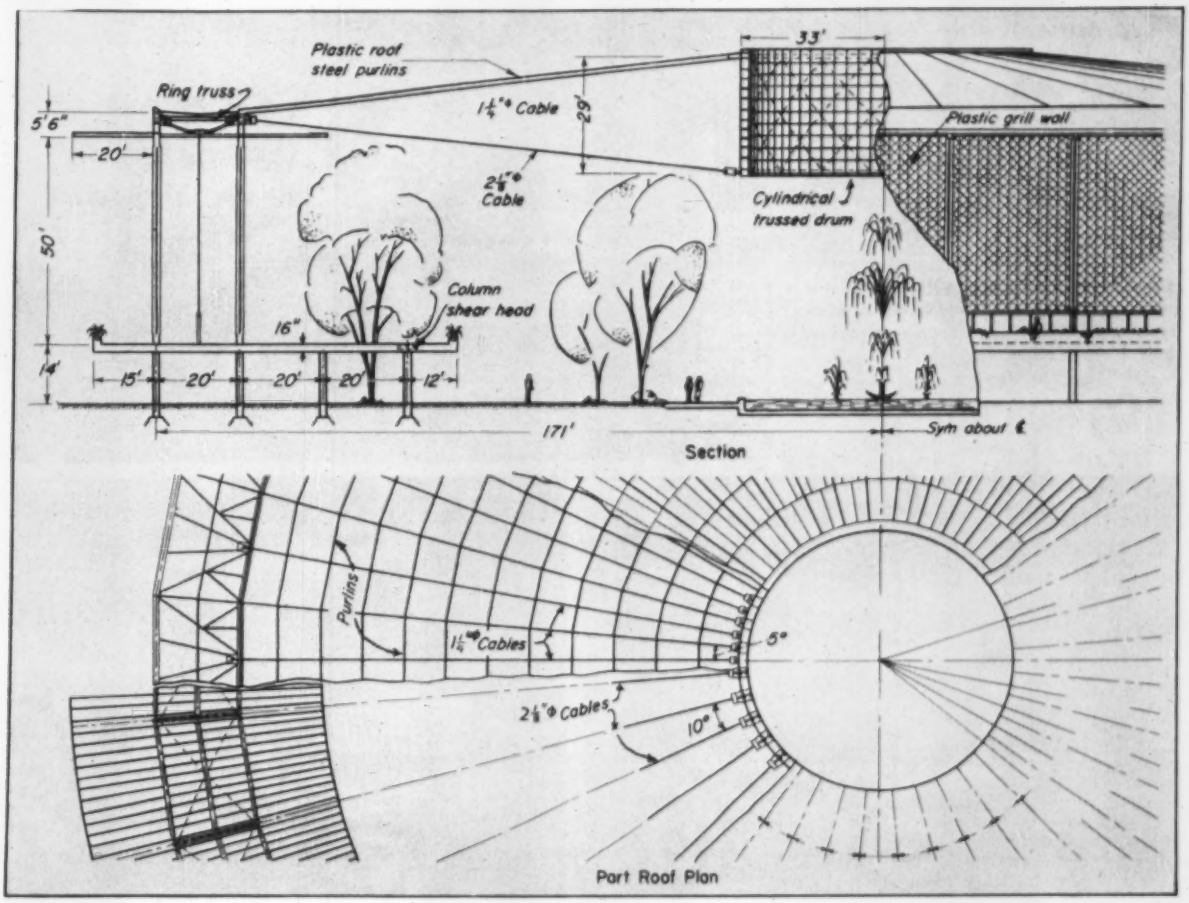
U. S. PAVILION, shown in model form above, will cost an estimated $5 million. The American installation will also include a 1,000 seat circular theater (above right).

The theme of the fair is man's entry into the atomic age, and thus the Atomium represents the arrangement of the nine atoms in a crystal of iron, enlarged 150 billion times. Following the usual diagrammatic representation for such a crystal, the atoms, 59 ft spheres, are arranged in a cube, one at each corner and one in the center at the intersection of the diagonals. The sides of the cube, connecting these spheres, are tubes 10 ft in diameter and varying from 59 to 72 ft in length.

This unique structure is mounted with one of its diagonals vertical and attains a total height of 360 ft. In addition to the central support under the bottom sphere, A-frame columns are used under the three next lowest spheres.

The scale of the structure was determined by the fact that these three spheres and the three disposed along the vertical diagonal of the cube were to be accessible to the public. The topmost sphere will contain a restaurant for 250 people, while each of the others will contain two floors of scientific exhibits. An elevator will be installed in the central vertical tube and escalators in the inclined tubes below the central sphere. Escalators will move only in the up-direction, visitors coming down by the elevator or by stairs mounted on the diagonal bracing of the A-frame columns. Each of these columns, it may be noted, is 40 ft wide at the base, 100 ft high and weighs 100 tons. There are 2,000 tons of steel in the whole structure.

Each of the steel spheres will be encased in an aluminum sphere, and light bulbs will be spaced along the paths of nine great circles that mark the con-



SECTION AND PLAN of U. S. Pavilion show structural system. Cables support hub along its lower edge. Top edge, supports other cables that carry steel purlins. The design provides a circular, column-free area 300 feet in diameter.

struction joints of the spheres. Flashed progressively, these lights will appear to move around the sphere and so will represent the movement of electrons around an atomic nucleus.

The problems of designing and erecting this unique structure have been many and varied. Arc welding is employed throughout, and the steel used has an elastic limit of 50,000 psi and an ultimate strength of 78,000 psi. The basic structure of the spheres is a series of arch ribs. For the spheres on the vertical axis, these ribs rest on the central tube, while for the other spheres they rest on a cradle of steel girders forming the lower surface of the spheres.

The tubes are designed as bearing shells, the plates in the central tube being ½ in. thick and in the inclined tubes ¼ in. thick. These inclined tubes penetrate the spheres to a bearing on a face of a cubical core structure that concentrates the loads from the different directions. The tubes are made rigid by interior longitudinal and transverse stiffeners in the form of folded sheets which have been welded to the cylindrical plate.

To simplify fabrication as much as possible, the spherical shells were made up in a number of identical pieces. The surface of each shell was divided according to a symmetrical arrangement of nine great circles, which formed the boundaries of 48 equal spherical triangles. These could be fabricated readily. Where windows were desired, triangles of steel could be replaced with plexiglass triangles. The same sort of surface division was used for both the inner steel and the enclosing aluminum spheres.

The aluminum spheres are mounted on the steel spheres by means of adjustable chairs in which rubber buffers are incorporated. These take care of differential expansion and contraction between the two metals. It had been planned to spray the inside of the steel spheres with an insulating material, but experiments on the first one erected showed that this would not be necessary. The heat-reflecting characteristic of the aluminum provided enough insulation.

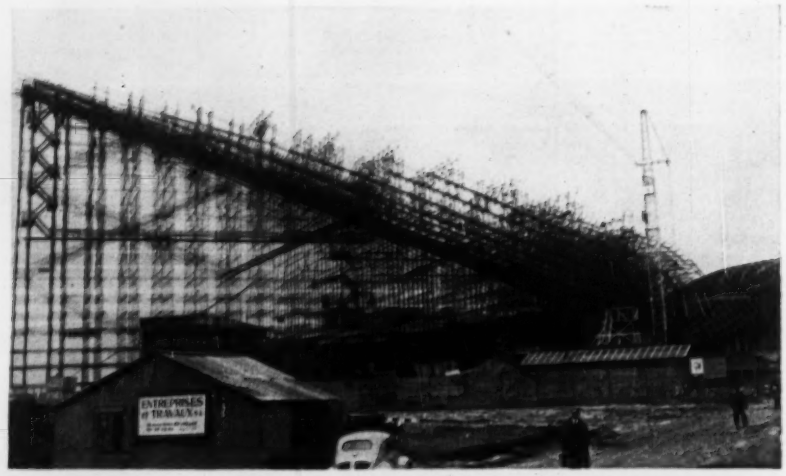
To support this heavy structure four separate foundations are used. In the center, 59 piles, each with a 55 ton working load, are arranged in four concentric rings. Of cast-in-place type, the piles go down to a depth of nearly 60 ft and carry at their top a 6½ ft thick concrete slab, 39 ft in dia and reinforced with 1¼ in. bars.

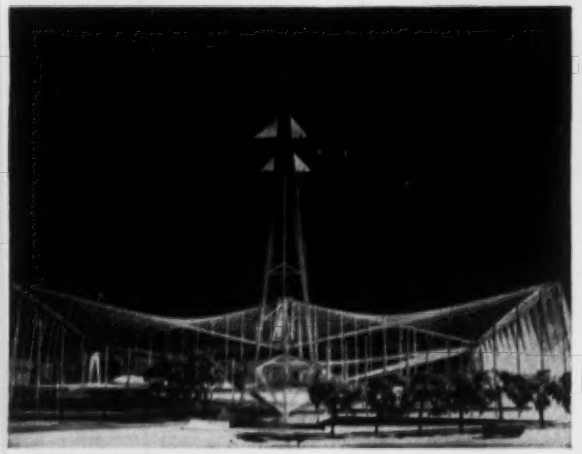
For each of the three foundations for the A-frames, 12 batter piles are used, also designed for 55 tons. The footings are rectangular slabs, which carry the ball-joint bases for the A-frames. These A-frames are articulated top and bottom as are also the adjacent inclined tubes. The result is that the lower triangles of steelwork are three-hinged frames. In addition, all of the tube connections to the central sphere except those on the vertical axis are hinged. By these articulations, it is sought to remove as much tendency to bending in the inclined tubes as possible.

The idea for the Atomium and the principles of its arrangement were conceived by Andre Waterkeyn, manager of the economics department of the Federation of the Belgian Metal Fabricating Industries. The architect is A. Polak, aided by a team of consulting

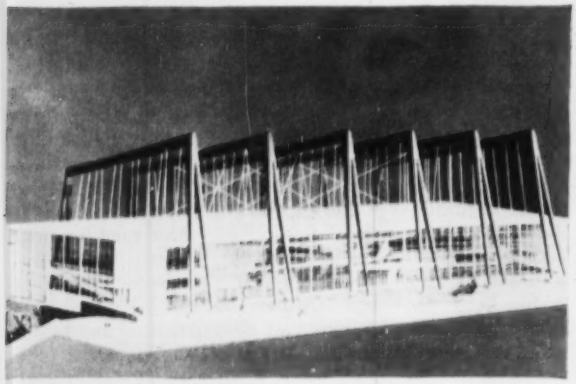
. . . Brussels fair

CIVIL ENGINEERING EXHIBIT (above, right) will feature a reinforced concrete arrow cantilevering 238 ft, counterweighted by a domed auditorium.

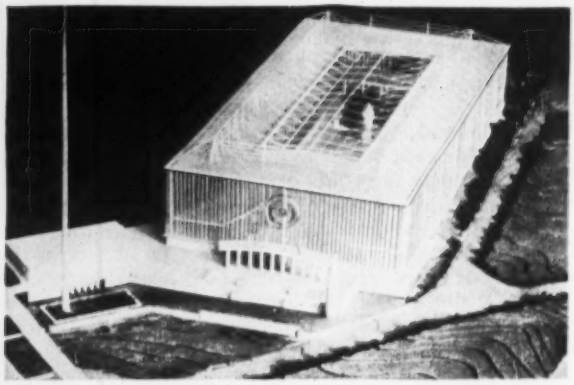




FRENCH PAVILION, shown in model form from two angles, will have a roof supported by cables outlining two hyperbolic paraboloids, each covering a 230 ft square. The main support will be at the base of the "arrow," which counterweights the roof.



EUROPEAN COAL AND STEEL COMMUNITY is also constructing a pavilion with a cable-supported roof, 60,000 sq ft in area.



RUSSIAN PAVILION, built around a statue of Lenin, will cover nearly four acres, reportedly contains 160,000 sq ft of mirrors.

engineers consisting of Messrs. Beckers, Joukoff and Daniel.

• **The U. S. Pavilion**—With the Atomium setting a pattern of structural innovation, the U. S. pavilion is definitely in the mode. The building is roofed with a tensioned cable system of unprecedented design. Likened to a bicycle wheel, the cables, as the spokes, stretch between an inner tensioning and an outer compression ring. A truss, framing between the tops of two concentric rows of columns, which are the building's sole means of support, forms the outer ring—the rim of the wheel. The inner ring, or hub, is a circular truss 66 ft in diameter. Unsupported from below, it is held up entirely by the tensioned cables, for which it serves as a central anchor.

Cables are attached to both the top and bottom chords of this hub truss. Those at the bottom are 2¼-in. dia and radiate to the columns. The top cables are only 1¼ in. dia, but there are twice as many of them to furnish a shorter span for the roof purlins, which are installed in concentric rings.

Erection of this roof has been relatively simple and fast. Conventional procedures with crawler cranes were used to install the outer ring and the

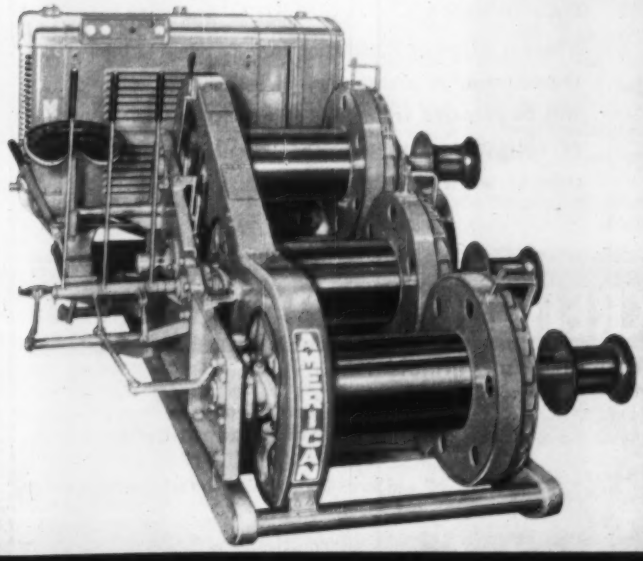
HOIST GETS WORKOUT ON 4-STORY JOB!

This job, a 2-story addition to a 2-story building, means the elevator makes only short runs—the hoist starting and stopping hundreds of times per day. The clutches and brakes of the American hoist used on the job get a real workout!

Colored glass spandrels will highlight the new Washington Title Insurance Company Building in Seattle. One hundred tons of steel, 1000 yards of concrete and 1000 yards of plaster will be used on the job. Two hundred tons of debris were removed to prepare for the addition. The 3-drum American powers platforms in a double-well tower and a Chicago boom.

On start-stop assignments like this, the power, speed and responsive controls of American hoists start loads up faster—assure safe, profitable materials handling. American's big, cooler running contracting band friction clutches and brakes provide exceptionally long life and safe performance under start-stop duty. On skyscraper jobs where there's a long haul to the top of the tower and tough stops at the bottom, you'll find American hoists' performance equally reliable!

Look around—you'll see more American hoists at work than any other kind! Why? It's contractor preference based on years of safe, highly dependable performance. Ask your American Distributor for complete technical details on this line that begins with capacities of 3,000 pounds single line pull!



AMERICAN'S BIG 70-B General Purpose Hoist has a capacity of 7,000 pounds single line pull. Available with 2 or 3 drums and swingers, this tough hoist offers an outstanding lineup of features: anti-friction self-aligning ball bearings; silent chain drive; machined gear teeth; balanced interchangeable drums; and easily adjustable, reversible clutch and brake bands.

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Building a Grandstand, Stadium, Balcony?

SUPERIOR RISERFRAMES Perform Two Functions

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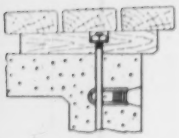
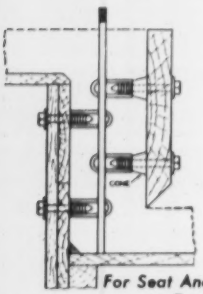
2 *Provide secure anchorage for seat brackets.*

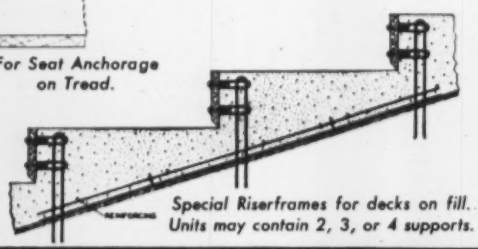




For Seat Anchorage on Tread.

The advantages of Superior Riserframes have been demonstrated and proved in the construction of hundreds of grandstands, stadiums, and balconies of auditoriums and theatres.

The front riser form is accurately supported, spaced and aligned by the Riserframe to which it is secured by temporary coil bolts. After stripping, seat brackets are easily attached with permanent ½" coil bolts which engage the coil sockets embedded in the concrete. For seat anchorage on treads, Riserframes with ½" diameter cold rolled rods, threaded at one end, are used for the vertical connection as shown in drawing at left. A nut secures the metal bracket or wooden seat bolster. For decks on fill there are special Riserframe units as shown below.



Special Riserframes for decks on fill. Units may contain 2, 3, or 4 supports.

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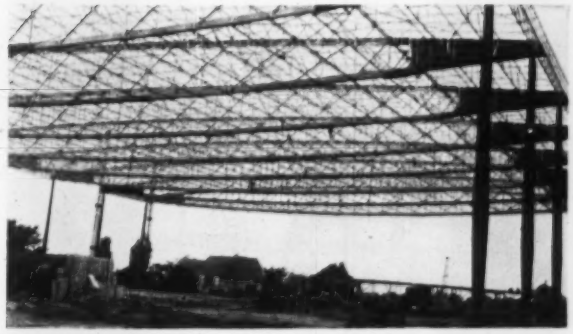
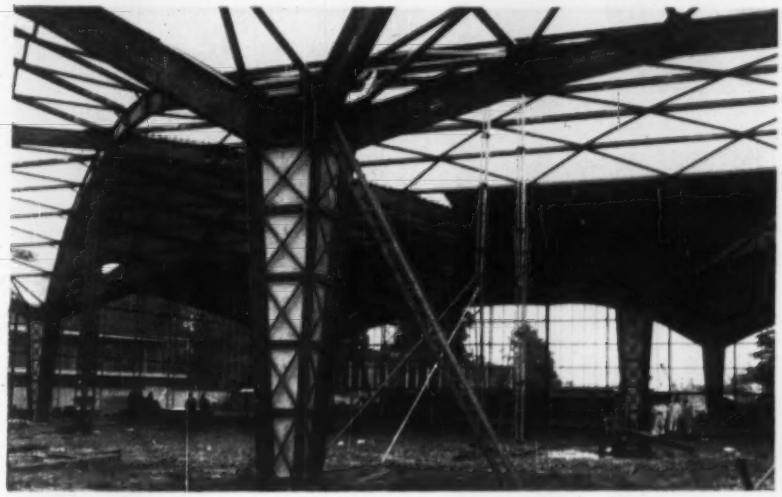
. . . Brussels World's Fair



TRANSPORT EXHIBIT BUILDING utilizes fish-belly trusses combining steel (dark-colored in photo) and aluminum.

HOLLAND BUILDING is a steel-arch-framed dome enclosing a hemispherical space. It will house a model of the seacoast dikes.



BRITISH PAVILION will consist of a series of domes framed in steel.

SPANISH PAVILION will be constructed of steel members in a novel arrangement.

columns. Concurrently a falsework of tubular members was erected on which the hub truss was assembled by a hammer-head type derrick set in the center. The cables were then stretched from the outer rim to the hub and tensioned by high-capacity hand jacks, making them taut enough so that the hub would drop only a matter of inches when the falsework was removed. To give the cable system additional vertical rigidity, a system of diagonal rod trussing was installed between the upper and lower cables, after which the roof purlins were laid. These will support a novel plastic roof manufactured by the Kalwall Corp., Manchester, N. H., utilizing a plastic called Hetron, made by the Hooker Electrochemical Co., Niagara Falls, N. Y.

There will be no roof over the area within the central hub, and the plastic roof will extend only to the centerline between the two rows of outer columns. Beyond this, however, there will be a roof of more conventional type framed with I-beams cantilevering from the columns in a plane just below the lower chord of the outer rim truss. Actually these I-beams, oriented radially, are continuous across the columns and also cantilever an equal distance on the inside of the building so that they form an annular ring of framing that serves to strengthen the outer compression ring against the pull of the cables.

This remarkable framing system was developed in the office of Edward D. Stone, New York architect, where the entire concept of the building originated. Basically the idea is to have a building which encloses a garden, providing some protection from the elements, but admitting light to the greatest degree possible. Thus, in addition to the translucent plastic roof, the walls will be a diagonal mesh backed up with a transparent plastic. There will also be a ceiling of gold-anodized aluminum mesh attached to the lower plane of roof cables.

Although the building may be said to have two floors, the second floor is merely a ring around the outside in the area beneath the ring of I-beam roof framing. This floor, which will accommodate exhibits, is of reinforced concrete in a waffle-slab pattern 60 ft wide, cantilevering both sides of the building columns and thus overlooking both the interior ground floor garden and a garden on the outside. Features of the interior garden are a large pool and several small ones with interspersed flower beds and trees. In addition to the gold-colored ceiling, the columns, which are tubular—of plain surface below the first floor, but equipped with fins above—will be painted gold. The U. S. installation will also include adjacent to the main pavilion, a 1,000 seat theater in which American films, music and drama will be presented.

The steelwork for the U. S. pavilion was fabricated by a German firm, Cologne-Wesselinger Eisenbau, and the building is being constructed by a Belgian contractor, Blauton-Aubert.

(*Continued on page 44*)

PROBLEMS
IN WATER
FILTRATION

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. . . The French Pavilion at Brussels

BOX-SECTION WELDED ARCHES, spanning 198 ft, frame an extension to the main entrance building. Walls (not shown) are ceramic-covered prestressed concrete panels.

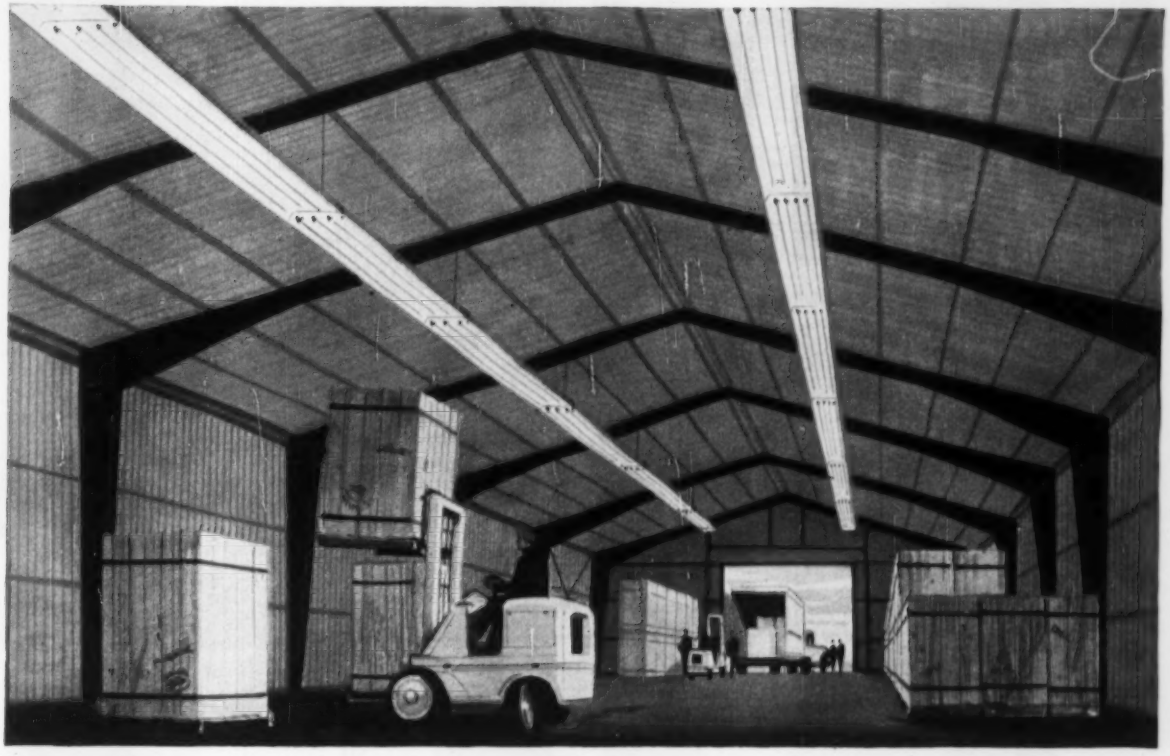
• **The French Pavilion**—Vying with the U. S. pavilion for structural novelty, the French pavilion also will use cable-supported roof, but here the cables will outline the surface of two adjacent hyperbolic paraboloids, each covering a square 230 ft on a side. The unique feature is that the rigid edges of these curved surfaces will form a part of a framework theoretically balanced on a single point of support by counterweight in the form of an "arrow," angling upward outside the building to a height of about 200 ft.

Actually two other points of support are provided at the end of the diagonals of the squares radiating from the main support, which is in the center at one edge of the building. By holding the outer ends of the main carrying trusses (which follow the diagonals) at a temporarily high elevation until the rigid edge members of the roof are in place and the cables installed, these outer ends can then be lowered to their permanent supports. This action automatically tensions all of the roof cables, and is under control of the "arrow" counterweight at the central support. This is the real feature of the French pavilion—a hyperbolic paraboloid roof entirely in tension, with all cables stressed simultaneously and automatically.

As will be noted from the views of a model of the building (on page 40) there are three low points in the roof (at the supports) and three high points (at two of the corners and at the center of the long side of the building opposite the main central support). The low points are 63 ft above the ground and the high points 122 ft. The rigid edge members of the roof run between adjacent high and low points. Thus members project both ways from the main support and also both ways from the supports at the opposite corners. These members outline the perimeter of the building. In addition there is a rigid edge member across the center line of the building, projecting from the main support opposite the "arrow" counterweight. This edge member separates the two hyperbolic paraboloids of the roof and is common to both. It is not supported at its outer end and, in fact, none of the vertical members—which appear as columns in the pictures of the models—provides any support for the roof; they are merely mullions between which the glass walls will be installed.

• **Civil-engineering structure**—To dramatize the role and abilities of the civil engineer, the Belgian Ministry of Public Works is sponsoring a symbolic structure of unusual type and dimensions in thin-shell concrete. It consists of a counterweighted arrow projecting 238 ft from its support to a total height of 109 ft. The counterweight consists of a platform, triangular in plan and 65 ft wide at the back. Covered with a thin-shell roof, the platform will be utilized as an auditorium.

The support for this structure consists of three legs resting on a concrete mat, in turn carried by piles, 28 of 100 ton capacity and 87 of 60 ton. The arrow, constructed in ordinary reinforced



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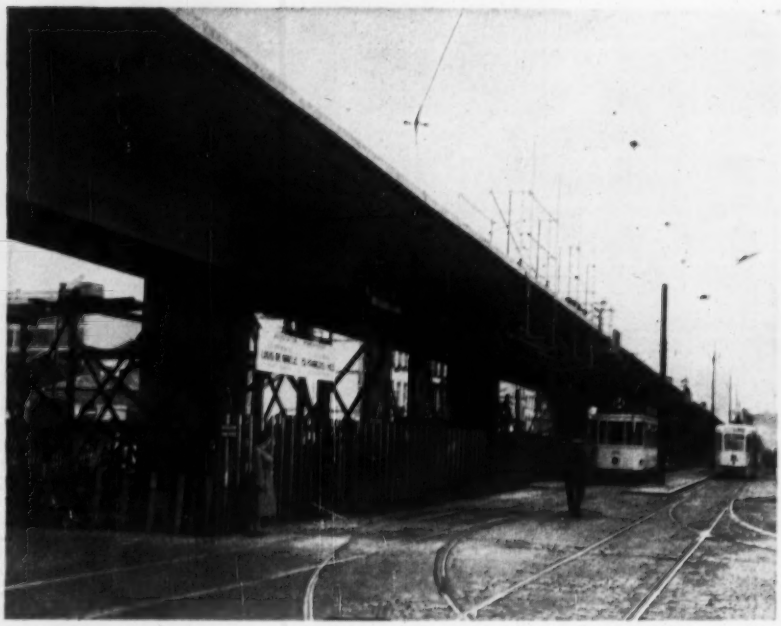
. . . The World Fair at Brussels, Belgium



ELEVATED HIGHWAY, with a single row of columns supporting a three-lane roadway, is part of Brussels' ring-road modernization. Some sections are underground.

concrete, is V-shaped in section, 33 ft deep at the bottom and tapering to about 1 ft at the top. The walls of the V are 8 in. thick at the base of the arrow, thinning to 1¼ in. at the tip. Flanges on the top edges of the V accommodate most of the reinforcing, with some also in the root of the V. Construction of this arrow is being carried out in timber forms supported on falsework assembled from 250 tons of steel tubing.

Beneath the tip of the arrow, this civil-engineering exhibit will also include a building for technical displays, and between it and the auditorium at the base of the arrow will be a map of Belgium constructed of colored stones in a mosaic pattern on the ground. Visitors can look down on this map from a bridge of remarkable type—a prestressed concrete ribbon only 2½ in. thick and supported only at the ends 100 ft apart. According to the design, enough tension can be placed in the prestressing wires to make this bridge comfortable to walk on if not entirely free of deflection.

• **Other structures**—Among the fifty-odd major buildings being built on the world's fair site are a number of others, not so striking as those described above, but nevertheless of interest. A few of them are shown in accompanying illustrations.

The Russian Pavilion, which is being built under the largest budget of all, is a gigantic parthenon-like structure built around a statue of Lenin. This pavilion will be fabricated in the USSR then erected on the site. At the closing of the fair, the pavilion will be dismantled and taken back home to serve as the main hall in Moscow's permanent agricultural fair.

West Germany, on its 6½ acre fair site has plans for eight different pavilions which will be linked by glass tunnels.

Japan will construct a wood, paper and bamboo pavilion that will represent a blend of modern and centuries-old traditional designs.

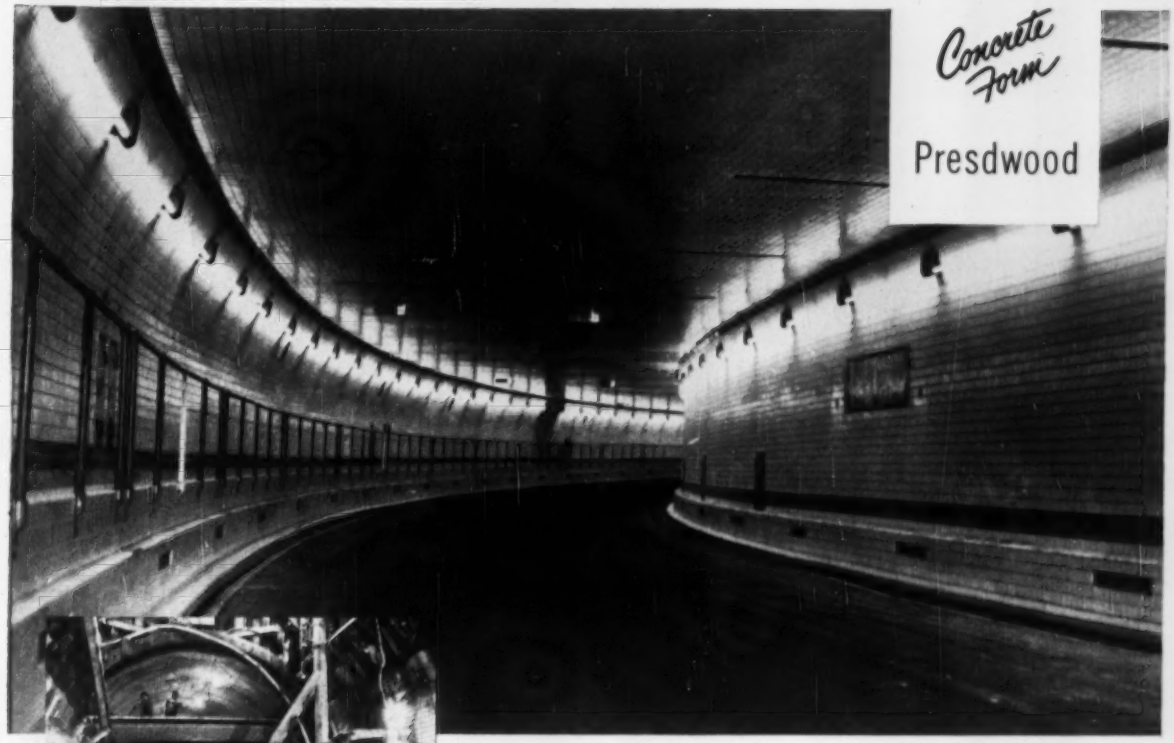
The Holland building will be a dome structure housing an exhibit of "water, friend and foe." This will be a display of some of the structures employed in keeping back the sea.

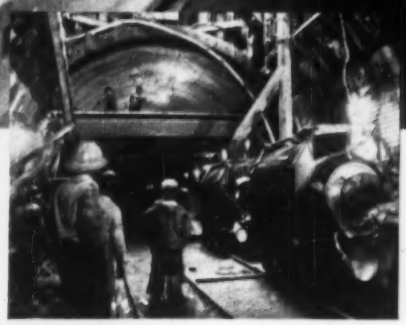
The British Crystalline Hall will be a series of domes framed in steel which will house a number of exhibits including one on Great Britain's forward steps in the field of nuclear energy.

It is always a question how much world's fairs, in their buildings and exhibits, merely reflect contemporary architectural and engineering and how much they actually influence future design. This still remains a question with the Brussels World's Fair, but it is already amply evident that numerous attempts have been made in its structure to carry the application of present knowledge beyond its conventional limits.

The result is a structural engineering exhibition that should excite the public with the possibilities within its grasp if it wants to accept them.

MASONITE





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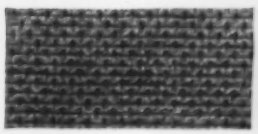

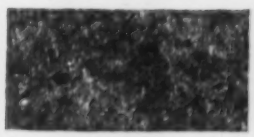

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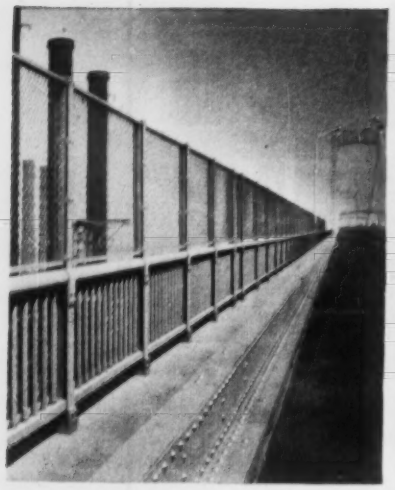
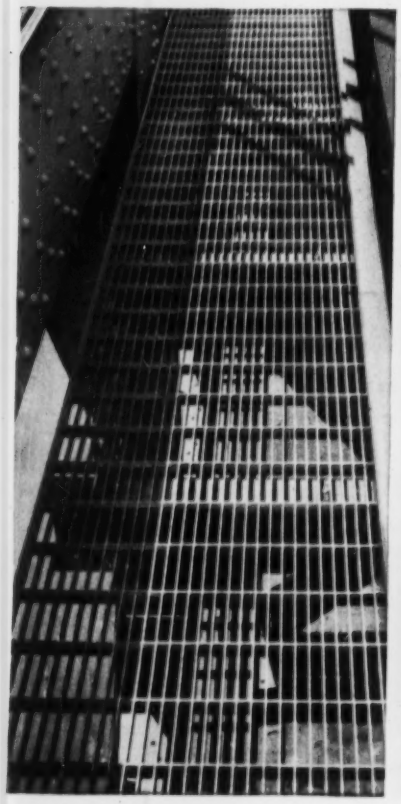
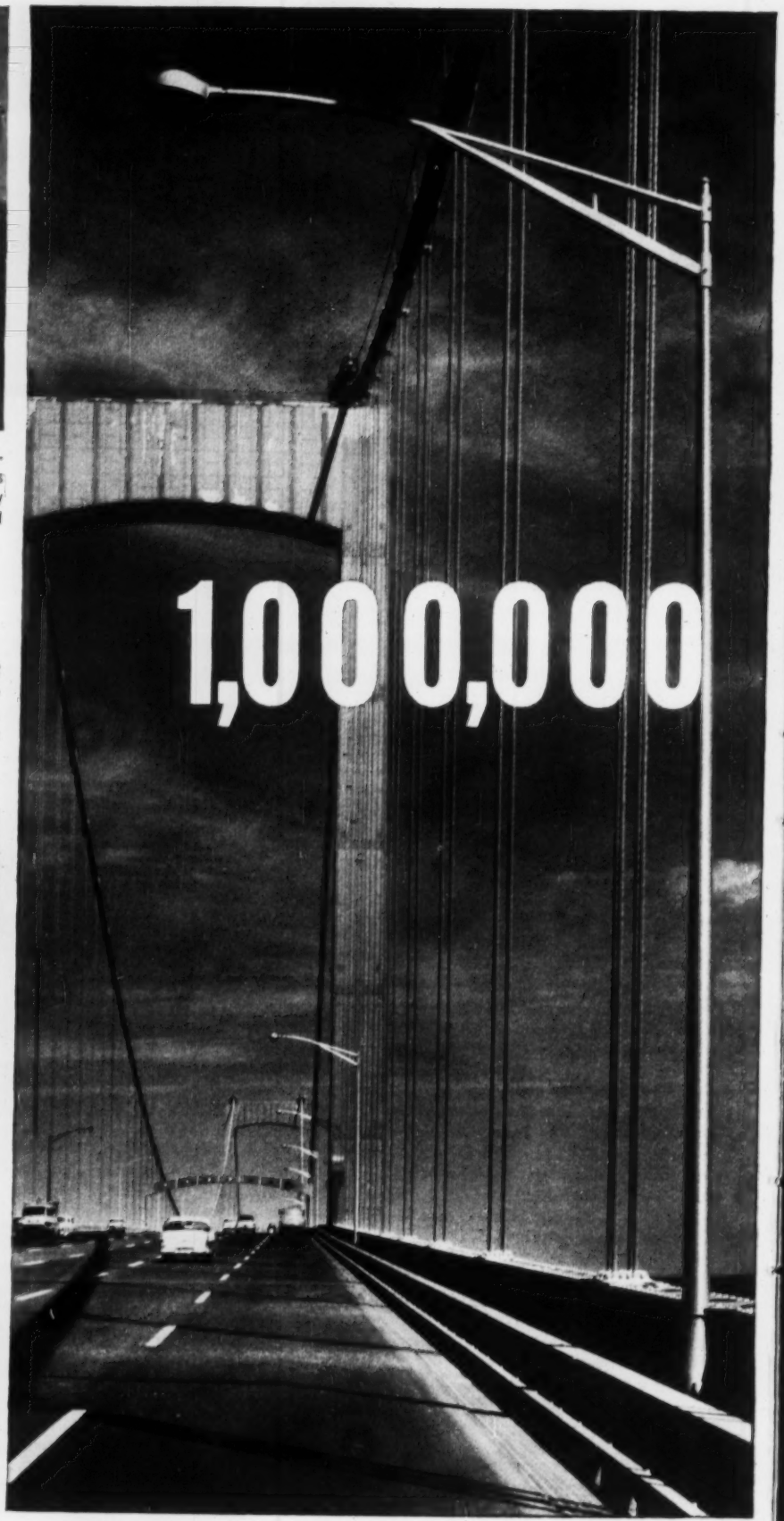


MORE THAN SEVEN MILES OF ALUMINUM RAILINGS AND FENCING guard the bridge's approaches and main span. Comparable in first costs to steel, they will save countless dollars in maintenance costs and and all painting problems.

MORE THAN A MILE OF ALUMINUM GRATINGS on both sides of the Walt Whitman bridge provide safe walkways for stranded motorists and workmen. Gratings weigh 66% less than steel, require less costly supporting structures, yet meet all loading requirements. Next-to-impossible painting is eliminated.





The new Walt Whitman Bridge soars 3,500 feet across the Delaware River to link the Pennsylvania and New Jersey turnpikes. Modjeski and Masters—Ammann and Whitney were consulting engineers. Bethlehem Steel Company was general contractor.

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Expressway Builders' Headache: Traffic

The single toughest problem for contractors on the 13 mi long section of the Long Island Expressway now under construction is a familiar one for any builder who works in a city:

Keeping traffic moving and keeping up utility service to the heavily populated surrounding area.

And the single toughest spot on the stretch of road is one long familiar to metropolitan area builders—the site of the New York World's Fair of 1939 and 1940, where a swamp was converted with garbage fill into a magic city for two short seasons and since has become a rather weed-grown park.

The Long Island Expressway, eventually to be 91 miles in length, will run from the point where the Queens-Midtown Tunnel emerges into Queens County at the western tip of Long Island, through the populous Borough of Queens bisecting almost equally populous Nassau County, and then plunging into almost rural areas on its way to Riverhead, county seat of Suffolk County which encompasses the eastern end of Long Island.

The highway will become the seventh major artery crossing the length of the long, narrow (16 mi wide) island which has become simultaneously New York City's favorite playground and its largest dormitory.

The sections between the tunnel and Queens Boulevard—slightly over halfway through Queens Borough—have already been completed. Work is now being pushed from that point eastward for a total of 13 mi to reach a point almost exactly halfway through Nassau County (ENR Nov. 3, 1955, p. 45). The remaining sections of the road are now under design, although they probably will not be up for bidding until some time next year.

A ROAD WILL BE BUILT HERE—on site of 1939 World's Fair, where swamp was filled in with garbage. Muck must now be removed, replaced with firm material.

• Keep it running, moving—The location of the road creates the toughest problem—that of keeping parallel and cross traffic operating.

Queens County, with its 1.5 million people, and Nassau County, with more than 1.3 million people, generate an enormous volume of traffic, both business and personal. Many small factories in both counties depend entirely on truck transportation, and, with the exception of a few subway and elevated lines which do not reach the county edges in Queens, all transportation is on the surface.

There are no specific counts as to average traffic on the route of the expressway, which is being built in the right-of-way now occupied by one of the Island's main arteries—State Route 25-B, known within New York City as Horace Harding Boulevard. Traffic, however, is of such proportion that detours must be built to first-class highway standards.

In addition, both sides of the road from Queens Boulevard to the City Line are solidly built up with either one-family or multi-family dwellings and small store developments of one sort or another. This occasions not only a structure at almost every intersection but the necessity of maintaining communications on all side streets and all streets fronting the highway development.

Therefore, for all of the seven contracting organizations working on the highway, the first job has been to install service roads on the edges of the 300 ft

HAND WORK has a place, as bull floats do screeding job on 6 in., unreinforced slab

and Utilities

right-of-way obtained by the city, so that traffic can be diverted to them while the old road is torn out and, in most places, depressed below the existing level.

By the same token, the numberless underground utility lines carrying water, gas, electric, sewers and storm drains must all be moved, reinstalled and returned to operating condition before the major work of the main highway is completed.

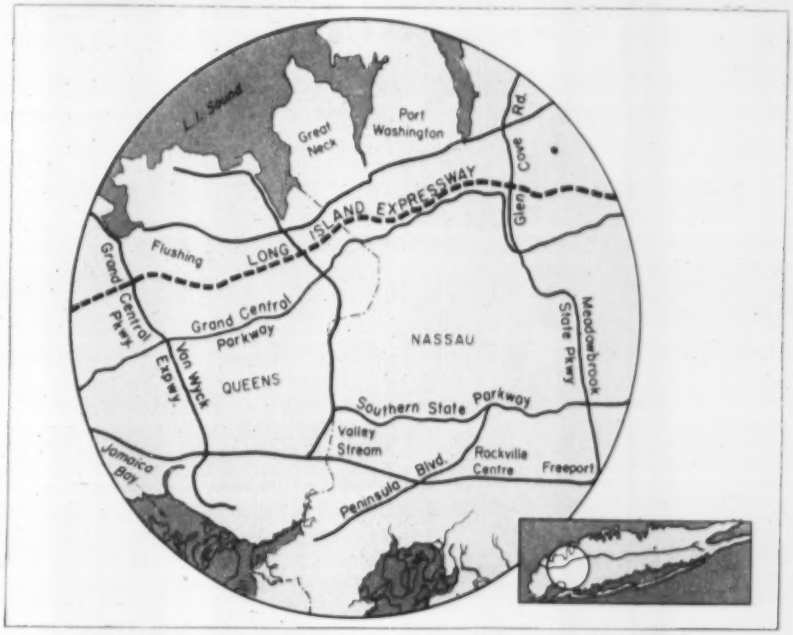
• **Fairground bugaboo**—Back in the late "30s" when New York City began to prepare for its major gesture of confidence in the future—the World's Fair of 1939—it took over what it euphemistically called Flushing Meadows, in northeast Queens County. The "Meadows" were, in fact, a swamp through which meandered a tidal stream known as the Flushing River which drained the shallow uplands to the south, emptying into Flushing Bay and eventually Long Island Sound.

Over many years this area had been used as a garbage dump by the city and by individuals until it was the unsightly home of mountains of rotting garbage, tin cans, automobile carcasses and similar items. A great deal of this refuse was simply leveled, covered with top soil and became the foundation for the World's Fair.

The transformation of Flushing Meadows into the site of the World's Fair and later into a city park was and is nothing short of miraculous, but the method of transformation has been a constant problem to the builders. One road, Horace Harding Boulevard, cuts the old fair grounds almost exactly in half. The south half was the site of the fair's amusement area, the north half that of the exhibition buildings. Even though most of these structures were temporary and extremely light considering their size, many of them had settled and cracked before the fair was over in the fall of 1940.

Horace Harding Boulevard, over the years, has assumed the appearance and riding sensation of a roller coaster, with sizable dips as whole sections of the road have dropped below original grade.

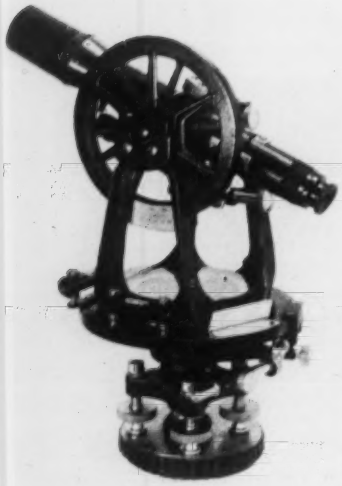
To rebuild this section for the new Expressway, which will provide one of the more direct routes eastward from the city, New York State is ripping out the old roadway to replace it with a new and better built surface. The ripping out will include two major structures—where Horace Harding Boulevard intersects Rodman Street, a north-south route of some importance and crosses over the marshy Flushing River—here confined between steel sheetpiling walls. This overpass, of concrete and steel construction, also has settled to some extent



NEW YORK'S NEWEST EXPRESSWAY has nearly 3.5 million people living within the immediate area. Keeping communications open for them is major problem.

that will form base for service road. Asphalt topping will complete job.

TEMPORARY DETOUR: Traffic on existing road is so heavy, detours and service roads must go in before main job begins. Wearing surfaces will be asphaltic concrete.



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RUBBER
WATERSTOPS
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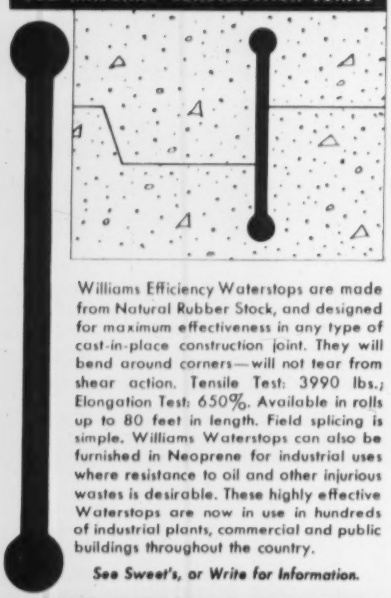

Williams Efficiency Waterstops are made from Natural Rubber Stock, and designed for maximum effectiveness in any type of cast-in-place construction joint. They will bend around corners—will not tear from shear action. Tensile Test: 3990 lbs.; Elongation Test: 650%. Available in rolls up to 80 feet in length. Field splicing is simple. Williams Waterstops can also be furnished in Neoprene for industrial uses where resistance to oil and other injurious wastes is desirable. These highly effective Waterstops are now in use in hundreds of industrial plants, commercial and public buildings throughout the country.

See Sweet's, or Write for Information.

WILLIAMS
EQUIPMENT and SUPPLY CO.
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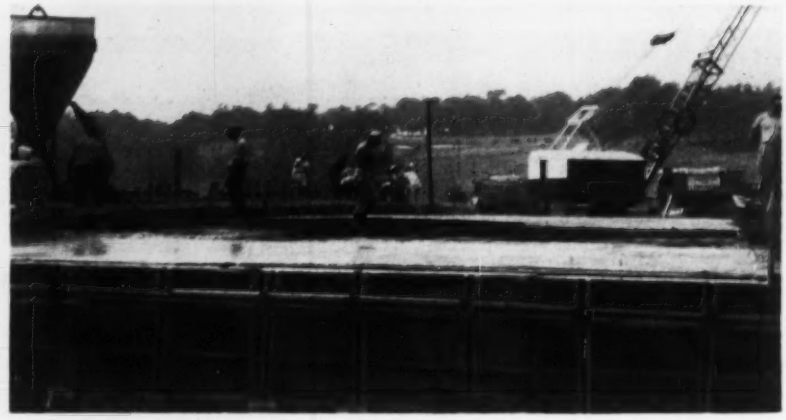
. . . Traffic must move while construction goes on



ONE of dozens of bridges to carry local streets over expressway, this one was cast in two days (500 cu yd of continuous pour) in eastern Nassau County.

and in any case is not nearly wide enough to handle the traffic on it now, let alone future traffic when the Boulevard becomes the Expressway.

• **First, stabilize**—First move, then, for Tully & DiNapoli, which holds a $6.6 million contract for the section through the old fairgrounds—was to stabilize the area in the park to the north of the existing road. In order to do this, the company called in a subcontractor, the George Brewster Company of Bogota, N. J. which put in a total of 1,230 sand drains, with an average length of 55 ft, and 20 in. in dia, to stabilize the area adjacent to where a detour would have to be built.

In other areas, where the poor material is about 25 ft deep and sand drains are uneconomical, the muck is completely removed by dragline and clamshell and replaced with select fill.

This detour, by the way, is one of the most elaborate temporary roads probably ever built.

Now under construction, it will consist of a total of 11 in. of pavement, beginning with 5 in. of trap rock, placed over stabilized fill, bound with sand and rolled, then a 3 in. trap rock layer bound with asphalt, topped by a 3-in. wearing surface of asphaltic concrete. The roadway will be 70 ft wide, with a 4-ft center mall, and 12x12 timbers for curbing. It will be provided with full city street lighting.

And, as soon as the new roadway is completed, the entire temporary road will be torn up and returned to park uses.

Elsewhere in this section, the ground is so unstable that timber piling has been called for under all drainage structures and other underground utilities, and concrete piles under the three bridges which will provide access to the expressway, to local streets and from one side of the park to the other when the job is completed.

Some idea of the extent of this piling work can be drawn from the fact that contract quantities call for 62,000 ft of untreated timber piling; 105,000 ft of creosoted timber piling, and 98,000 ft of cast-in-place concrete piles. Something over 240 catch basins alone must be built, and, in order to provide a stable footing for the new road and structures, there will be more than 150,000 cu yd of muck excavation alone involved in the contract.

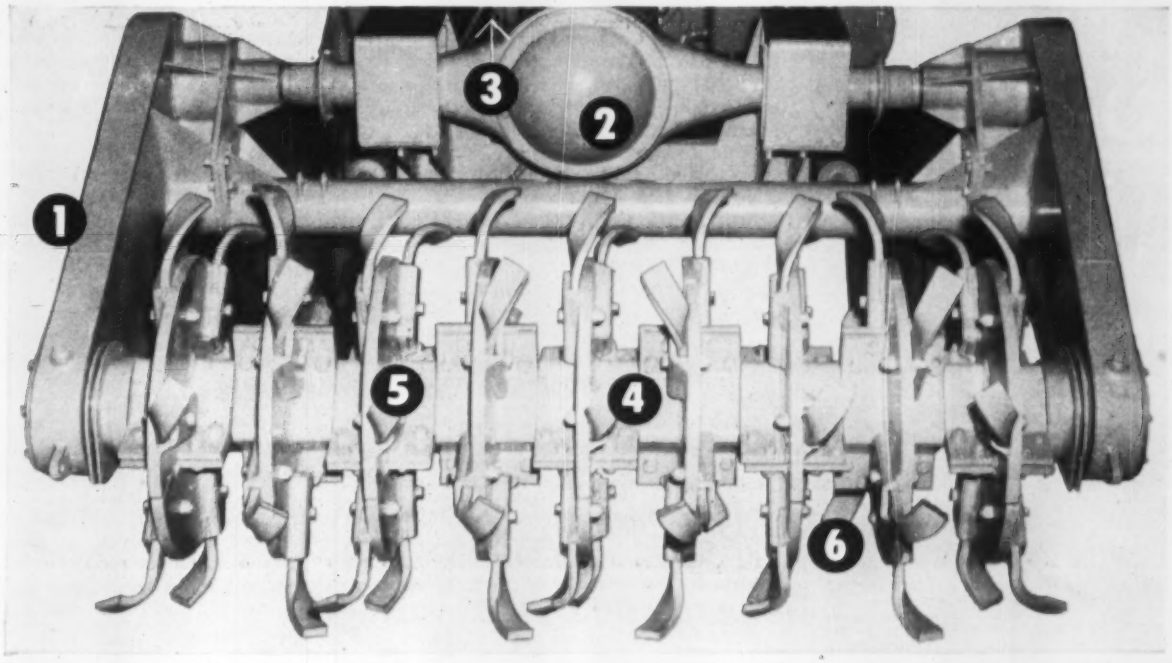
• **Similar problem**—In the area just behind the Tully & DiNapoli contract, that is, a stretch between Queens Boulevard and the old fairgrounds, Klevens Corp. has a somewhat similar problem, complicated further by the existence of apartments and other structures on one side of its job.

The area under contract to Klevens is equally unstable, and was also in large part a garbage fill which the city at one time covered for use as a veteran's housing project immediately after the war. With an elevated roadway on fill also designed for this section, all structures here also will have to be supported on piling and a great deal of muck excavation is expected.

Because of the added complication at the Queens Boulevard end—the road connects with an intersection that already has four levels (including a subway track below a depressed roadway on Queens Boulevard) — progress on this section has been comparatively slow.

• **Other sections**—Further along the road to the east, the Gull Construction Co. of New York has, among other things, probably more catch basins to build than anyone else—over 400 of them—as well as the installation of siphons for storm drainage at most

If you are doing Soil Stabilization work, you know why this design is so important



The BROS Roto-Mixer's performance during the past two construction seasons has been sometimes described as truly amazing. If you know in-place soil stabilization machines and jobs, as you review the design features below, you'll readily understand why.

CUTS MIXING TIME

1. Because drives are at outside ends of the rotor shaft, even mixing is accomplished in one pass. No need of a second pass to provide uniform mixing.

Full width mixing or any increment up to 7′ is easily handled. Split-disk type tool plates are quickly removed for shoulder maintenance or other narrow work.

2. Three-speed transmission and 150 usable HP at 1800 RPM provides a greater range of mixing speed . . . and mixing control which eliminates "surging" effect.

3. Independent hydraulic control of rotor and hood provide ample space for proper mixing to 12″ depths. Materials are uniformly blended in a smooth, even course.

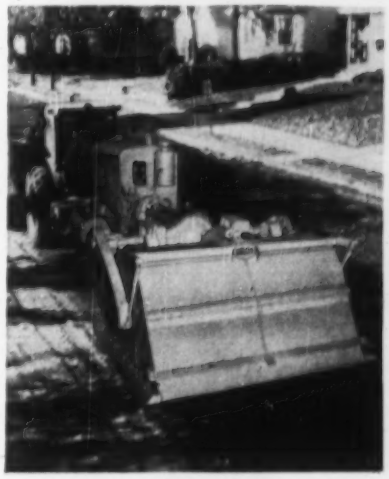
CUTS MAINTENANCE COSTS

4. 6″ square solid steel rotor shaft easily withstands shocks and strains of in-place mixing of rocky soils.

5. Split-disk type tool plates are of heavy-duty construction; quickly and easily removed or remounted.

6. Simplified tool holders. Heavy-duty mixing tools are socket mounted, held by one bolt. Replacing worn tools is done in minutes.

You'll be glad to learn of the other important design and construction details of the Roto-Mixer. So see your nearest BROS Distributor for full information and a demonstration. Or write us today.



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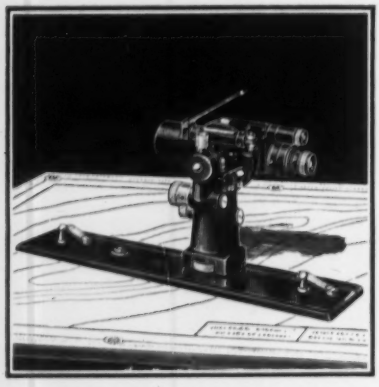

WATTS MICROPTIC ALIDADES
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For swift accurate field mapping and surveying, leading surveyors rely on the Watts Microptic Alidade. The Watts Alidade is highly accurate, compact, light weight, versatile and dependable. See the advanced-design Watts Microptic Alidade with exclusive pillar levelling at your nearby Dietzgen Dealer. Made by Hilger & Watts, Ltd., London; sold and serviced in the United States by the Eugene Dietzgen Co.

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DIETZGEN

. . . New contract safety feature added

One of the peculiar problems that has been faced by Konrad Hageman, Gull's superintendent on the job, has been that he actually has had to pave a new lane on the existing road so that he can "steal" a lane from the south side of it to be incorporated in a service road. The new lane will itself be torn out as soon as the northern service road is established, while the main highway is under construction.

A constant problem here, as elsewhere along this part of the route, is that of maintaining service to the hundreds of homes and small businesses that border the work. "It seems to be a rule", comments Hageman, "that we never manage to break a water or sewer line when no one is using the facilities. Invariably someone is taking a bath just as we drop a bucket—unintentionally—and break a water connection."

The next major intersection of the Expressway with existing roads is at Alley Pond Park (ENR Sept. 27, 1956, p. 56) where the Slattery Rock Co. has virtually completed paving of a huge complex overpass of bridges and underpasses across another swamp which will eventually become a city park, across the 6-lane Belt Parkway, and other roads.

• **Open country**—Within a mile or so of this intersection the road leaves Queens County, enters Nassau and enters what stands for rural country in this densely built area.

From this point onward the contractors, Lizza & Sons of Oyster Bay, and Tuckahoe-Davis, are working on what is much more nearly a standard superhighway job than is possible within the city limits.

In this area the new road parallels and crisscrosses back and forth over the existing route 25-D, at one point being within a few hundred feet of the 4-lane Northern State Parkway. In its crisscrossing, the road cuts through a number of golf courses and some large estates, where at least the problem of utility lines and the like were not serious. However, again because of the heavily populated area, almost endless numbers of bridges for local roads are required.

Some of these are standard deck girder structures over small roads and local water courses, several of them, however, are fairly major concrete structures.

One of these is the new Hyde Park road bridge, being subcontracted for Lizza by the Horn Construction Co.

This structure, an arch, has been placed in two pours totaling 1,000 cu yd of concrete for the entire bridge. The arch is 5 ft thick at the center column and at the abutments, 2½ ft thick at the center of the arches.

The pour of one entire half section, just short of 500 cu yd, was completed in one day, using two cranes and ready-mixed transit trucks.

• **Pavement**—On the whole job, the pavement will consist of two 36 ft roadways on either side of a center mall which will vary in size from a minimum of 12 ft in width.

In addition, the entire road will be paralleled by service roads on either side, each of these being 32 ft wide.

The pavement, a standard 9 in. reinforced concrete slab, will be treated with carbon black, according to state specifications.

A final contract on the expressway system, to carry it to Guinea Woods Road, recently was awarded to the Tuckahoe-Davis firm, of Hicksville, N. Y., for a low bid of $4.8 million.

This contract is an excellent demonstration of the complexity of the job, even in so-called open territory. As an example, in a total contract length of 1.44 miles, the contract will include seven highway grade separation structures; 5½ miles of service road, parkway connectors and access ramps; and 4.39 miles of guard rail and center mall barrier installations.

• **Contractor Safety**—One feature of the job is something relatively new to New York City areas.

That feature is one that the contractors appreciate highly—a requirement by the state (and paid for as an extra by the state) that all construction sites be completely surrounded by wire mesh fencing of the stock fence category, supported on steel posts driven into the ground, and with openings at controlled gates only for admission of contractor personnel and equipment. (On recent contracts, the fencing has been included as a bid item, as has expenses for uniformed watchmen.)

The requirement grew out of the death of seven children in an excavation in Brooklyn more than a year ago (ENR, June 28, 1956, p. 100). Lack of adequate fencing to keep children out of the construction site was blamed in part for the tragedy, despite the fact that the contractor in that case was found to have had sufficient watchmen on the scene.

The new requirement, however, makes it possible for the contractor to work right in the middle of a residential area, without interference from neighborhood children or curious passers-by, provides a positive barrier for any cross traffic and a much safer place to leave materials and equipment during periods when work is not going on. Universally, all the contractors are much pleased with the requirement.

Now from Link-Belt Speeder—a

new, high-speed 3-yd. hoe

Answers the need for an agile, mobile...more powerful, deeper digging...big-capacity hoe

Here's the largest production-model hoe in the industry! It's the same proven design as the highly successful K-608 shovel and dragline now available with a new 3-yd. hoe attachment. The hoe attachment has 30-ft. boom (maximum reach of 51½ ft.), and will dig to a depth of 31 ft., 10 in. Cutting width, with side cutters, is 5 ft.

Featuring a matched engine-torque converter package with output-shaft governor, the K-608 delivers power that is automatically and constantly matched to the load. Results—faster cycles, greater fuel economy, elimination of engine stallouts due to load.

Other features of this quality and precision-built hoe include bonus *usable* horsepower, hydraulic power steering, and hydraulic-actuated clutches that automatically compensate for heat and normal lining wear.

For comprehensive details, call your Link-Belt Speeder distributor or write: LINK-BELT SPEEDER CORPORATION, CEDAR RAPIDS, IOWA.

FAST, NON-FATIGUING, POSITIVE CONTROL — Like all Link-Belt Speeder models, the K-608 features power hydraulic controls as standard equipment. A flip of a short-throw lever puts the K-608 through its paces. Response is fast, positive, smooth. Operator fatigue is practically eliminated. 14.051

It's time to compare . . . with

LINK-BELT SPEEDER

Builders of a complete line of shovel-cranes . . . with exclusive Speed-o-Matic power hydraulic controls

With 30 to 50% fewer moving parts, the Allis-Chalmers diesel in this shovel...

...puts more power to work digging and loading

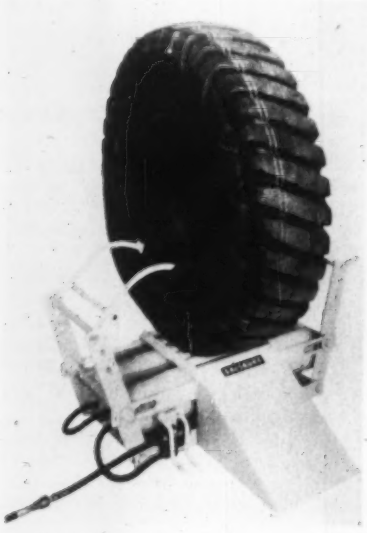
THERE IS UNUSUAL SIMPLICITY in Allis-Chalmers engines. The Allis-Chalmers diesel in the shovel shown working above, for instance, *has 30 to 50 percent fewer wearing parts than competitive engines!*

THAT MEANS LESS WEAR . . . LESS THAT CAN GO WRONG when parts are fewer and stronger. Your equipment keeps working; you do more digging and loading.

MORE POWER GOES TO WORK with Allis-Chalmers engines — not only because there are fewer moving parts, but because more efficient combustion means maximum power from the fuel.

You can have this simplicity, economy and durability in Allis-Chalmers engines of *any* size or type, 9 to 516 hp — *any* fuel, LP or natural gas, gasoline or diesel — for *any* application. See your Allis-Chalmers dealer for full information. Allis-Chalmers, Buda Division, Milwaukee 1, Wisconsin. BC-7A

ALLIS-CHALMERS *Engineering in Action*



Line of Four Spreaders Speeds Big-Tire Changing

Handling all size tires from the smallest passenger car tires up to and including 37.5-33, four models of Salsbury Tire Spreaders are now in production. Included in the range of tires handled by these spreaders are heavy duty truck, earthmoving and off-highway tires, both regular and tubeless.

Features of the spreaders include operation from standard air line, roll-up ramp eliminating tire lifting, bench mounting and complete portability. Salsbury Corp., 1161 E. Florence Ave., Los Angeles 1, Calif.

Wide-Frame Tripods Have Bronze Heads

The Berger wide frame tripod for engineering instruments has a 3½ in. dia solid bronze head with bronze bearings mounted on stiff or extension legs of maple, and is claimed by the manufacturer to provide an extra resistance to twisting.

The tripod comes with 7 in. long shoes with oversize pushdown spurs and hardened steel replaceable tripod points. Band clamps with wing nuts secure the legs in the extension type, which are adjustable between from 38 in. to 61 in. The tripod comes complete with wrench for removal of shoe points and tension adjustment.

The firm also makes a builders' model with aluminum tripod head in either stiff or extension leg models. C. L. Berger & Sons, Inc., 37 Williams St., Boston 19, Mass.

Dump Body Developed For Sand, Gravel Haulage

Designed for efficient hauling of sand and gravel, a new truck dump body, called the Press triple-tapered dump body, is wider at the front than the rear, higher in the front than the rear, and longer at the bottom than the top.

Principle of the new design, according to the manufacturer, is to allow for greater load on the front end of the vehicle, to take advantage of strict weight laws in various states. Tailgate control is operated manually from within the cab and a 20 ton telescopic hoist is used to raise and lower the body. Jacob Press' Sons, Inc., 501 W. 33rd Pl., Chicago, Ill.

Chemical Cuts Corrosion From Salt-Treated Slush

An improved rust inhibitor is said to render salt-slush non-corrosive to passing vehicles.

The product is said to be odorless and non-toxic, as well as harmless to skin, animals, plant life, paint and automobile finishes.

When mixed with the rock salt on ice and snow covered streets, it forms a thin film over metallic surfaces that come in contact with the salt-slush. Other reported advantages are the ability to resist caking (making it easier to handle and mix with salt) and the ability to protect against corrosion for an extended period of time.

The product is available with a coloring agent that causes treated slush to glow with a faint green to indicate the presence of the rust inhibitor. Hagen Chemicals & Controls, Inc., 323 Fourth Ave., Pittsburgh 22, Pa.

Cement Silo Unloads Its 100 Barrels Fast

Substantial savings in the handling costs of dry cement are said to be offered by a fast unloading bulk cement silo and trailer.

Available in a standard unit, or custom-made to requirements, the silo unit aims at eliminating unloading delays, with positive pneumatic or conveyor-combination unloading. Featuring low clearance, and even load distribution, the 100 barrel rig is reported to be permanently water-tight. Forster Mfg. Co., Ada, Okla.

Hydraulic Excavator Has 40 Mph Road Speed

Hydraulic operation, 360 deg swing and speeds up to 40 mph are features of the B-4 Hydra-X-Cavator-Crane.

The back-hoe attachment has a digging depth of 11½ ft and can be used to load high-sided trucks—loading many over the front if necessary. Other available attachments include shovel, crane, clamshell, grapple, ditch cleaner and catch basin cleaner.

According to the manufacturer, the B-4 conforms with all state highway regulations for length, height and weight. Powered by a 6 cyl Continental F-226 engine, the excavator is equipped with heavy duty four-speed truck transmission and clutch, Timken drop forged I-beam section spring mounted front axel, and hypoid gear rear axle. With a turning radius of 17½ ft, the crane can be maneuvered in close quarters.

The all-hydraulic drive is powered by a 30 gpm pump. Davis Engineering, Inc., Benton Harbor, Mich.

TRU-LAY *flexible* PUSH-PULLS

FOR

Remote Control Jobs on a great variety of Construction Equipment

Adaptability to all sorts of mechanical situations explains, in large measure, the wide-spread use of TRU-LAY PUSH-PULLS on tractors and their accessories, power shovels, winches, road graders, road oilers, dump trucks, snow plows, engine-driven pumps, rock crushers and other construction equipment.

These dependable Push-Pulls are used for the remote control of hydraulic and air valves, brakes, clutches, transmissions, throttles, chokes, governors, power take-offs, and many other applications.

TRU-LAY PUSH-PULLS are precision products, not gadgets. They provide positive remote-action whether anchorages are fixed or movable . . . for light loads or loads up to 1,000 lbs. . . . and they are effective over short or long distances, up to 150 feet or more.

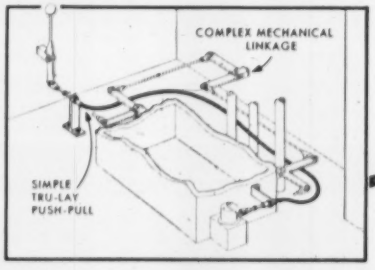
TRU-LAY PUSH-PULLS are dependable and accurate even under the most adverse conditions

They perform effectively under extremes of heat or cold . . . from jet engine temperatures to 70° below zero F. The inner, working member (lubricated for life during assembly) is fully protected by the tough, flexible conduit. Abrasive dusts, dirt and moisture are sealed out. Fittings are cold-swaged to make them integral parts of the control unit. It is a matter of record that we have never heard of a TRU-LAY *flexible* PUSH-PULL wearing out in normal service. Use of these versatile, simple and rugged controls increases ease of operation and means the virtual elimination of maintenance.

Advantages of Tru-Lay Push-Pull flexibility and simplicity are pictured below

Simplicity vs Complexity

Compare the TRU-LAY PUSH-PULL cable in illustration with the mechanical linkage. PUSH-PULLS are simple, have but one moving part, are noiseless and give lifetime service accuracy. Linkages are complex, made of many parts; they wear at many points. Their use brings increased backlash, lost accuracy and vibration rattles.



"Solid as a rod but *flexible* as a wire rope" is a good description of TRU-LAY PUSH-PULL REMOTE CONTROLS. This flexibility makes it possible to snake around obstructions . . . permits the ideal arrangement of all control elements . . . greatly simplifies installation of controls by reducing the number of working parts . . . damps out noise and vibration. Versatile, accurate, adaptable, rugged . . . they are the ideal remote controls for construction equipment.

*Our **DATA FILE** will answer your further questions*
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Education

Engineers on TV

Series will be designed to interest students in field

Aeronautical, petroleum, mining, chemical and electronic firms have joined at Denver in organizing a 36 week long television series to interest high school students in engineering. The series began Sept. 24.

Entitled "Target: Future," the series is sponsored by the Rocky Mountain Section of the Institute of Aeronautical Sciences and is appearing on the Denver School Board's local TV channel.

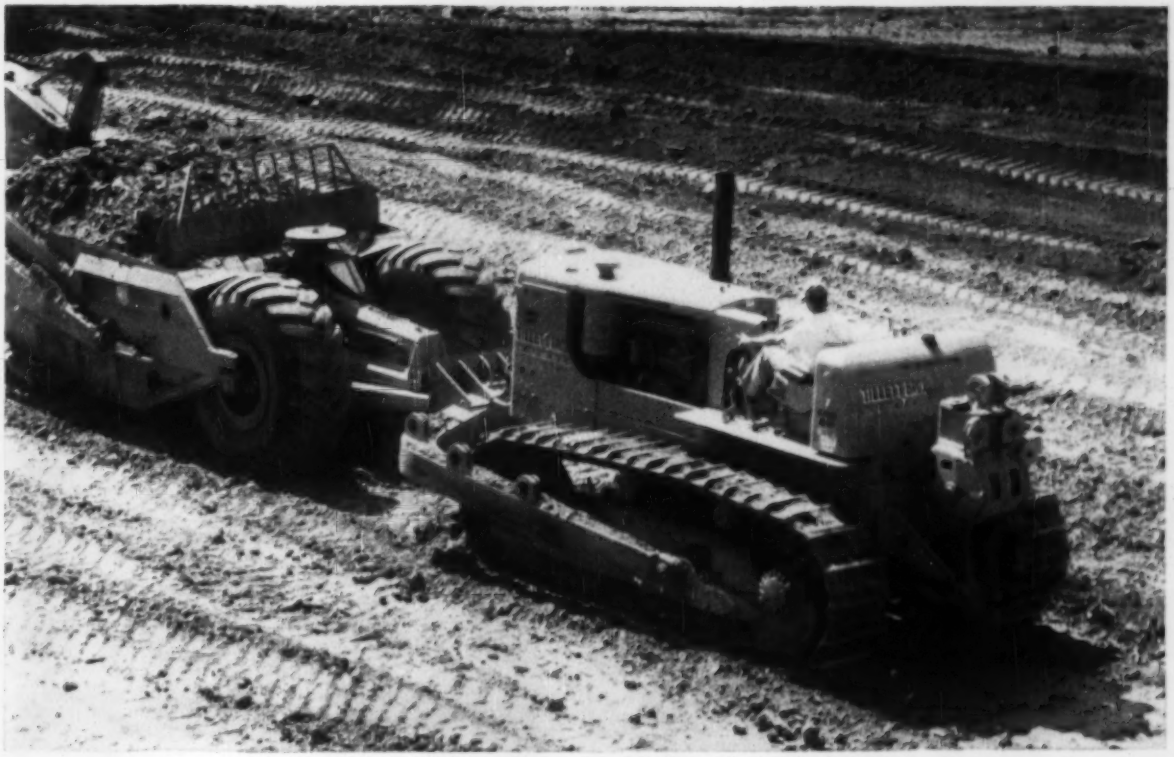
A total of 27 private firms, colleges and universities in the Denver area provided money, personnel and facilities for the 2½ hour weekly programs.

Engineering fields to be covered in the series are aeronautical, chemical, nuclear, hydraulic, mining, metallurgical, heat and power, structural, military, electrical, electronic, petroleum, human engineering and architectural.

Leaders in each of those fields in the Denver area will participate in the programs, which will include displays and exhibits to interest high school students in engineering as a career.

• **Full support comes from industry**—The chairman for the series is W. E. Brown of the Martin Co., which has built a $10 million guided missile plant southwest of Denver. He is chairman of the TV Activities Committee of the Institute of Aeronautical Sciences. He has said the program is unique in the nation in that industrial leaders representing all phases of engineering have grouped together in order to present graphically the skills that are used in each particular field.

Cooperating in the series are Beech Aircraft Corp., Carter Oil Co., Climax Molybdenum Co., Colorado Central Power Co., Continental Oil Co., Gardner-Denver Co., General Electric Corp., Heiland Division of Minneapolis-Honeywell Regulator Co., The Martin Co., Phillips Petroleum Co., Price Engineering Sales Co., Public Service Co. of Colorado, Shell Oil Co., Stanley Aviation Corp., Sunstrand Machine Tool Co., Webb & Knapp, Inc., United Air Lines, Westinghouse Electric Corp., American Society of Tool Engineers, Rocky Mountain Association of Geologists, Structural Engineers Association, U. S. Air Force Academy, Colorado School of Mines, Denver Public Schools, Denver Research Institute, University of Colorado, University of Denver and University of Wyoming.



Here's one of Tillett Brothers' Cat D9 Tractors push-loading on the Alabama by-pass job.
Both D9's are equipped with torque converter drives utilizing Twin Disc components.

"Torque Converter Equipped D9's save up to $600 a month,"

says Joe Tillett Jr., Tillett Brothers Construction Co.

When Tillett Brothers Construction Co., Shelbyville, Tennessee, was awarded a by-pass project just north of Montgomery, Alabama, this firm brought in, among other equipment, five Cat DW21 Tractors (two pulling No. 470 Scrapers and three pulling No. 21 Scrapers) and two big Cat D9 Tractors equipped with torque converter drives for push-loading.

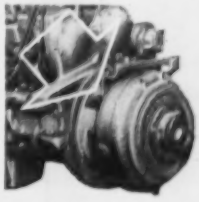
Once in operation, and with the break-out pattern naturally staggered, the two torque converter equipped D9's handled all five tractor-scraper combinations—even on the shortest hauls!

What does Joe Tillett Jr., President of Tillett Brothers, think of torque converter equipped D9's? "By increasing production and reducing maintenance," says Mr. Tillett, "the torque converter drive saves about $600 a month."

There are several good reasons why leading contractors like Mr. Tillett can produce such savings from torque converter equipped machines. The torque converter, for example, multiplies engine torque up to 6:1 when required. It permits the engine to deliver constant high-horsepower output. It automatically matches power to load demands, with gear-shifting minimized or eliminated, for increased operator efficiency. Heavy load pick-up is smooth and even, without clutch slippage. Shock loads and vibrations are cushioned out through the converter's fluid connection, for long tractor life and minimum maintenance. An infinite variety of ratios is available to work with, permitting smooth, accurate control of loads.

Caterpillar Tractor Co. offers its torque converter drive as optional in D9 and D8 Tractors, and has standardized on Twin Disc Torque Converter components for these versions of the two models.

See your Dealer today for complete information on torque converter equipped crawlers. Try one of these machines on your next contract and see for yourself how they get more work done on a comparative basis.



TWIN DISC

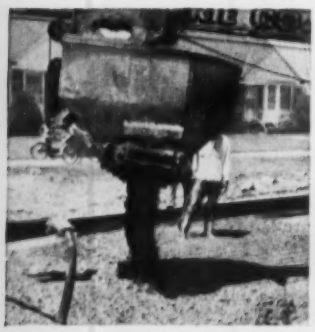
TWIN DISC

Torque Converters

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division), Rockford, Illinois

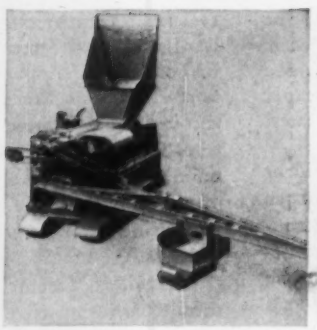
WORTHINGTON DUAL DRUM PAVEMASTER on the job for Detroit Contractor Thomas E. Currie Co. This is one of two pavers that worked 59 days straight with no downtime.

PAVERS BEAT DEADLINE

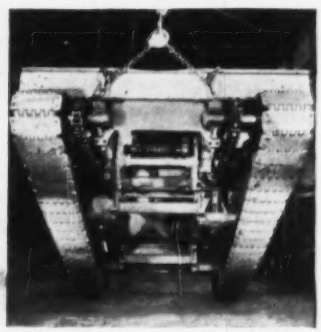


Hydraulic bucket control eliminates tedious hand spreading or the expense of a machine for certain types of projects.

Lightning fast charging. Skip travels from ground (right) to charging position of 56 degrees slope (left) in just 6½ seconds.



High bucket speed—256 feet per minute both forward and reverse—speeds operation, increases output on the new Pavemaster.



Rounded "cats" greatly reduce lug marks and gouges when traveling and enable Thomas Currie Co. to work on finished pavement.

93 BATCHES PER HOUR is Supervisor Cargill's average production. Hydraulically controlled boom with its fast, smooth swing assists operator in spreading concrete.

Equipment sold and serviced by J. R. Ponelli Co., Detroit, Mich.

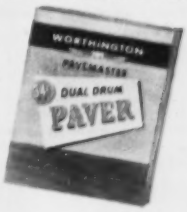
BY 2 WEEKS

Two Worthington pavers operate 59 days straight without downtime to help contractor finish in time

Longer life for skip cables is assured by a new type fabricated steel bullwheel and hoist drum with grooves for cable travel.

Weather trouble on a subdivision paving job put the Thomas E. Currie Co. of Detroit, Mich., three weeks behind schedule. "To catch up," said General Supervisor Glenn H. Cargill, "we ran our Worthington pavers 59 days straight. Not only did we make the deadline, but beat it by two full weeks. It's performance of that kind that makes new business an awful lot easier for us to get. In my opinion there's no other paver that can take it like a Worthington."

A respected name in Michigan contracting circles for the last 52 years, the Thomas Currie Company has used Worthington pavers for three decades. Says Mr. Cargill, "I highly recommend them to the contractor who wants maximum production with a minimum of downtime." On these two pages are some of the features of the new Worthington 34-E Dual Drum Pavemasters that Supervisor Cargill pointed out for special comment.



For your copy of this 28-page Pavemaster bulletin, please write to Section R-74, Worthington Corporation, Plainfield, N. J. Ask for Bulletin 1270-B1.

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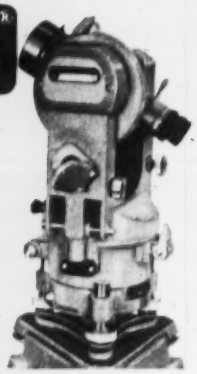
T-16
Optical
Transit



A brand new
WILD instrument
that's breaking records
for speed, accuracy,
easy set-up and operation!

The T-16 embodies many brilliant new concepts. They add up to a degree of optical and mechanical precision, as well as versatility, that you'll find **impossible to duplicate with any other instrument at this price.**

NOTABLE FEATURES OF THE WILD T-16

- Direct scale reading to 1 minute; interpolation to 20 seconds.
- Azimuth and vertical scales seen simultaneously and read directly.
- Built-in repeating clamp for setting on zero. Eliminates lower plate motions.
- New optical plumb with upright image to speed setting up.
- Optional accessories include battery box providing illumination for scales, level vials and telescope reticle.
- Excellent for mining, highway and land surveying.

PRICE: $700 F.O.B. Port Washington, N.Y. Tripods extra. Write for Booklet T-16

WILD HEERBRUGG
INSTRUMENTS, Inc.

RETAINING WALL to prevent lakeshore erosion is made of precast concrete sections set in lake bottom and guyed to "dead men" buried along shore.

LOOSELY BOLTED STRAP allows some hinge action between sections, enabling wall to give a little to ice and thawing ground.

BACKFILL is in place behind wall and docks are attached to treated wood piles bolted to face of wall under new boathouse.

Flexible Wall to Hold Shore

A precast sectional concrete retaining wall, loosely joined to allow slight movement, is solving a shore erosion problem at Indian Lake, Logan County, Ohio. Heretofore, the lake had been beating down every other kind of retaining wall tried, but the "flexible" wall, protecting a new marina, has held the shore in place through three big ice break-ups last winter and some rough weather since.

Factory-made reinforced concrete sections, each measuring 6x5 ft and weighing 2,000 lb, have their edges sunk about 3 ft into the lake bottom. The sections are guyed to "dead men" buried 2 ft in the muck along the shore. Premolded asphalt expansion strips are inserted in the vertical joints between sections providing a tight, flexible seal.

One panel is held to the other at the waterline by a single steel strap that is loosely bolted using lock nuts. This allows a slight hinge movement to take place, which enables the wall to yield a bit to the shove of lake ice or to give a little when the thawing ground heaves outward. Vertical striations on the lake face of the wall below the waterline are designed to chew on the moving ice edge and keep it always free.

A crushed limestone backfill is placed behind the wall after it has been straightened by drawing up on the guy wires. Weep holes at the normal waterline permit groundwater to escape into the lake. Pipe sleeves for the weep holes and bolt holes, plus lifting rings, are welded to the reinforcing steel mat before the panel is cast.

They beat the schedule and reduced the cost —

thanks to

STANG WELLPOINTS

"Build seven bridge piers, base them 18½ feet below a wet, sandy riverbed, at an elevation of 3500 feet... and do it in a hurry!" Such was the order confronting contractor Gordon H. Ball during construction of a new section of U. S. Highway 66 near Victorville, California, for the State of California.

Aware of the difficulties involved with a project of this type, general superintendent W. W. Haapala and job superintendent Joe Farrell immediately called on the John W. Stang Corporation.

Acting promptly upon the STANG recommendation, a system of STANG wellpoints was engineered and installed. At an elevation of 3500 feet, the single-stage STANG system achieved a drawdown of 18½ feet and completely dewatered the area to be excavated. *This speedy dewatering, done at a much lower cost than by other methods, allowed project completion ahead of schedule and at a profit!*

The STANG organization is ready and able, day or night, to render your water handling problems in the same time-and-money-saving way. Give them a call!

Putting water in its place

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...anyplace!

WRITE FOR BULLETIN 100

JOHN W. STANG CORPORATION

Engineers and Manufacturers of Dewatering Equipment, Wellpoint and Pumping Systems
Dewatering Planning—Equipment—Service

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•573

Lifetime protection from moisture for pennies!

When you consider the benefits it confers on a building, the cost of VISQUEEN film for a moisture barrier under concrete slabs and basement floors is negligible. Despite the fact that it will last as long as the structure it protects, the material is inexpensive to buy. Labor savings that derive from its seamless widths up to 32 feet, its light weight, and ease of handling (20 lbs. per 1000 sq. ft. .004″ thickness) in many cases offset the purchase price.

Investigate this material! Compare the advantages—dry floors that stay dry for life, concrete that will take *all* types of flooring, no cracking from moisture penetration. Write today for specification data, or clip and mail the information request tag.

information request tag

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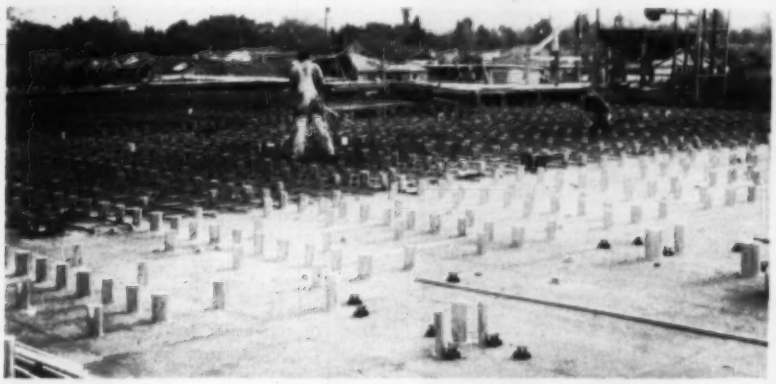
clip this tag— #EN9
attach to letterhead, mail.

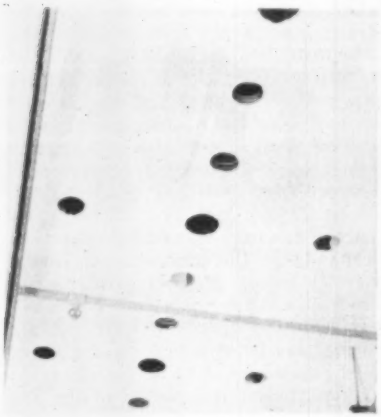
VISQUEEN *film is all polyethylene, but not all polyethylene film is* VISQUEEN. *Only* VISQUEEN *has the benefit of research and resources of* VISKING COMPANY.

PLASTICS DIVISION
VISKING COMPANY *Division of* UNION CARBIDE *Corporation*
P.O. Box 1410, TERRE HAUTE, INDIANA
IN CANADA: *Visking Limited, Lindsay, Ontario.*

Cost of the wall, according to the designer, James Askren of the Bellefontaine Development Co., runs to about $18 a running foot, installed. This compares with cost of $10 to $15 per lin ft for oak posts driven into the lake bottom along the water's edge—the common practice around Indian Lake. But, says Mr. Askren, the posts rot out within four or five years while his concrete unit wall should last for a lifttime.



TIN CANS are nailed to slab forms to provide holes extending partly through slab to ease later drilling for needed pipe conduits at new plant in Palo Alto, Calif.



HOLES in slab extend from bottom up to within 2 in. of the slab top.

CORING MACHINE is accurately positioned over hole to drill last 2 in. quickly.

Prepared Holes Ease Slab Drilling

Before placing 10 in. thick concrete floor slabs for a new plant requiring a great number of piping installations, 8 in. high tin cans were positioned on the wood forms by the contractor to provide access holes extending partly through the slab.

The plant of Varian Associates at Palo Alto, Calif., needed a large number of pipe conduits to bring compressed air and other gases to various locations on the second floor. Since it was essential that work layouts on the floor be flexible and since future needs could not be determined, it was decided to use the cans to serve as hole forms.

When future needs become known the holes already formed by the cans eliminate costly and time-consuming drilling through the full depth of the concrete slab.

The cans, varying in diameter from 4 to 5 in., were flanged to permit nailing to the forms. They were positioned with considerable care so that they could be located accurately later for drilling.

When new holes are needed, the cans are located by measurement. Then a diamond tipped machine is used to drill through the top 2 in. layer of the slab. Anderson & Rowe, Palo Alto, were contractors for this portion of the job.

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Kinnear Steel Rolling Doors are **Registered.** Full details on every door are held in fireproof vaults. Kinnear Doors never become "orphans". Worn or damaged parts are replaced even after **50 years of door service.**

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• Photo courtesy Russell, Burdsall & Ward Bolt and Nut Co.

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3. Uniformity

On all three counts, Mil-Carb Carburized Washers fill the bill best—developed *specifically* by the world's largest producer of washers to meet the needs of modern structural steel jointing.

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In addition, Mil-Carb Washers are uniformly flat and smooth with dimensions conforming to current requirements for heavy plain washers (carburized) of the American Standards Association (ASA Designation: B27.2).

For permanently strong, tight joints that become integral parts of the steel structure . . . as permanent as the steel itself . . . specify Mil-Carb Carburized Washers. Available in six sizes, from ⅝" to 1⅜", packed in 200-lb. kegs.

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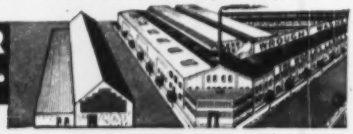

International

Big Step Forward

Trans-Canada road link opens in Saskatchewan

With the opening, early this month, of a 406 mi. stretch of road across the prairie province of Saskatchewan, the 4,572 mi long Trans-Canada Highway moved a step nearer to completion.

The highway, which will span Canada from the Atlantic to the Pacific, was originally scheduled for completion late in 1959. However, revised schedules, based on construction to date, indicate that the road will not be in full operation until after the end of 1960. Construction problems are responsible for much of the delay, since certain sections of the route traverse some of the most rugged terrain on the continent.

The mountain ranges of British Columbia, where construction is already under way, and the rocky north shore of Lake Superior are expected to give roadbuilders the most trouble, but construction across the level plains of Saskatchewan had its problems too. The hard-to-stabilize clayey soils of the province were a deciding factor in rigid subbase, base, and wearing surface specifications and, at that, the final requirements were admittedly a compromise between need and cost. Some maintenance already has been necessary on parts of the road that were finished last year and early this summer, and Thomas Gentles, design engineer with the Saskatchewan Department of Highways, has admitted that the final solution to highway construction on the Canadian prairies is yet to be found.

Nevertheless, completion of the Saskatchewan section of the transcontinental highway is regarded as a big forward step in Canadian road work. The highway was built over a period of three years at a cost of more than $27 million.

The road is on a 200 ft wide right-of-way and consists of two 12 ft lanes of asphaltic concrete with 8 to 10 ft shoulders. It is designed for 18,000 lb axle loads and a speed of 70 mph. The passing sight distance 4.5 ft. above the surface (one motorist's eye to another) is 2,300 ft. The stopping site distance from 4.5 to 4 in. (from the motorist's eye to an object on the road) is 600 ft.

The highway is being constructed under a plan that calls for the federal government to put up 90% of the money needed for the first 10% of the mileage and 50% of the money for the remainder. All the southern provinces except Quebec are participants in the program.

STEELDEK is made of 22, 24 or 26 gage, galvanized steel. Standard sheet sizes are 24½" wide by 8'2", 10'2" or 12'2" long. Ribs are 1" deep and 6" on center; they are fluted at one end to permit a 2" lap over the adjoining sheet.

NOW!

Penmetal brings you light STEELDEK

STEELDEK is a light, strong and economical roof decking or sidewall "skin" material developed primarily for nailing to Penmetal LIGHTSTEEL framing.

Designed to accommodate the usual spacings employed for LIGHTSTEEL studs and joists, STEELDEK can, however, be easily attached to purlins and girts in other types of construction. As a sidewall material, it provides smooth, "architectural" lines, whether installed horizontally or vertically.

Economical to buy, its light weight makes it easy to handle, easy to place. What's more, loads on supporting structural members are reduced, permitting lighter designs. Once laid, STEELDEK'S smooth surface is ready for insulation, built-up roofing and water-proofing.

Penn Metal is putting 88 years of experience behind its facilities for the production of STEELDEK. This means architects and engineers can look to a new, dependable source of light roof decking —reflecting traditional Penn Metal quality.

New folder SS-21 gives physical and structural properties, safe uniform loads, dimensions and erection details. Send for your *free* copy today.

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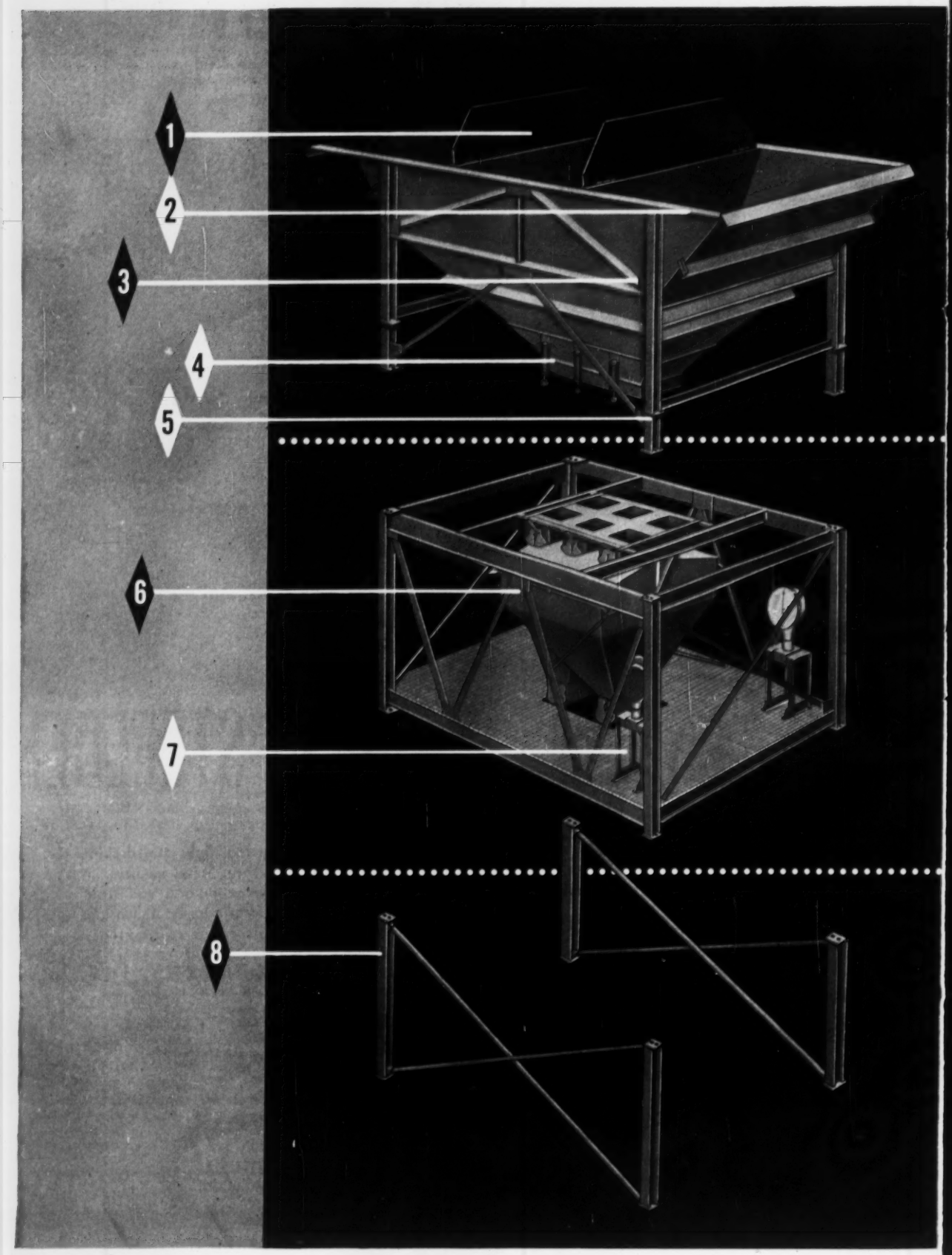
a name to remember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HELTZEL, long a leader in quality batching plants, now offers you extreme portability without sacrifice of dependable accuracy or rugged strength.

Heltzel engineers have developed a completely unitized batching plant to meet the requirements suggested by many of the nation's foremost highway and airport contractors. The plant is fast, versatile, and extremely portable. It can be transported with standard highway equipment and assembled quickly with a minimum of labor. It is dismantled just as easily.

This unitized plant is fabricated in three easy-to-handle sections: The hopper section with folding heap plates (1), compartmentation to suit requirements (2), structurally reinforced — all welded construction (3), capacity to 200 tons, air electric controls with instantaneous coupling with manual standby controls (4). Straight manual controls available. Column connectors (5) are extra large for easy spotting and rapid assembly.

The batching or intermediate section comes completely factory assembled with single, dual or twin batchers fully automatic or manual (6) and time proved, ultra high speed Heltzel weighing system (7).

The support section is formed of rugged, yet easy-to-handle wide flange beams (8) with bracing furnished for drive through in either direction.

You'll want to know more about this portable plant that works with all the speed and accuracy of a modern stationary plant. Contact your Heltzel representative or write direct.

THE HELTZEL STEEL FORM AND IRON COMPANY

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421

RAILROAD BRIDGE DECK BUILT WITH HOLLOW CONCRETE SLABS!

Western Pacific RR bridge. Bridge engineers of the Western Pacific RR, designers. Ben C. Gerwick, Inc., San Francisco, general contractor.

Close-up of voided slabs showing hollows formed by 16" O.D. SONOVOIDS.

Low cost, easy-to-handle

SONOCO SONOVOID® Fibre Tubes

form voids in precast concrete slabs

This bridge constructed for the Western Pacific RR is the longest all-concrete railway bridge in the United States. It crosses the Feather River between Yuba City and Marysville, California.

Pairs of 55-ton hollow precast concrete slabs make up the bridge deck for both approaches. Each slab is voided with two 16" O.D. Sonoco SONOVOID Fibre Tubes, to reduce weight and save concrete and reinforcing steel. The hollow cores also serve as conduits for signal communication wires and power lines.

Order economical Sonoco SONOVOID Fibre Tubes for use in the construction of prestressed, precast hollow piles and in precast or cast-in-place bridge decks.

Use also in concrete, wall, floor, roof and lift slabs.

Sizes to 36.9" O.D. in standard lengths to 18', longer on request. Can be sawed to specific lengths on the job.

End closures available.

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Books

Reports

• **Power for water**—A summary covering growth of power requirements for public water supplies from 1915 to 1953, plus a projection to 1975, has been published by the Water and Sewerage Industry and Utilities Division, Business and Defense Service Administration. A number of charts show, among other things, that daily average power required to operate the nation's public water utilities was 5 million kwh in 1915, nearly 15 million kwh in 1953 and is expected to be about 28 million kwh by 1975. Titled, Summary of Information on Public Water Supplies, Power and Fuel Requirements, 1915-1953-1975, copies are available at 10 cents each from Sales and Distribution Branch, U. S. Department of Commerce, Washington 25, D. C. and Department of Commerce field offices.

• **Plastics in NYC buildings**—Plastics approved by the New York City Board of Standards and Appeals in the 10 year period ending in May, 1957, have been listed in a research study completed by Joseph Platzker, former commissioner of housing and buildings for the City of New York.

The report lists the kind of plastic approved, the year it was first approved, and the building products made of the plastic. The report is available free from Joseph Platzker, 116 John St., New York 38, N. Y.

• **Atomic energy literature**—A 74 page booklet, Guide to Atomic Energy Literature for the Civilian Application Program, TID 4575, describes the technical information publications and services offered by the Atomic Energy Commission and tells how and where to obtain them. Part I of the guide describes the informational materials and services provided by the commission; Part II sets forth methods for locating and using the material; Part III explains how to obtain technical informational materials and services. For free copy write to U. S. Atomic Energy Commission, Technical Information Service Extension, P.O. Box 1001, Oak Ridge, Tenn.

• **Water resources data**—The Oregon State Water Resources Board has completed an index of all available information on quality of Oregon's surface and subsurface waters. The information is available, in two bulletins titled "Water Quality Data Inventory," from the Board, Capital Building, Salem, Ore.

(*Books continued on page 71*)

. . . Books

WATER FOR INDUSTRY—131 pp. American Association for the Advancement of Science, 1515 Massachusetts Ave., N.W., Washington 5, D. C. To AAAS members $3.25; non-members $3.75.

THE PRESENTATION OF TECHNICAL INFORMATION—by Reginald O. Kapp. 147 pp. The Macmillan Co., 60 Fifth Ave., New York 11. $1.95.

THE FIRST ONE HUNDRED AND FIFTY YEARS—A History of John Wiley & Sons, Inc. 242 pp. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. $7.50.

PRACTICAL APPLICATIONS OF ENGINEERING SOIL MAPS—Report No. 22. 114 pp. Rutgers University, New Brunswick, N. J. $3.00.

THE PROCEDURE HANDBOOK OF ARC WELDING DESIGN AND PRACTICE—Revised 11th edition. The Lincoln Electric Co., Cleveland 17, Ohio. $3.00.

ENGINEERING ENROLLMENT IN THE UNITED STATES—Edited by Norman N. Barish. 226 pp. New York University Press, Washington Square, New York 3. $7.50.

PRACTICAL HOUSE CARPENTRY—Simplified Methods for Building—by J. Douglas Wilson. 366 pp. McGraw-Hill Book Co., 330 W. 42nd St., New York 36. $5.50.

THE DARK MISSOURI—by Henry C. Hart. 260 pp. University of Wisconsin Press, 811 State St., Madison, Wis. $.600.

PROJECT ENGINEERING OF PROCESS PLANTS—by Howard F. Rase and M. H. Barrow. 692 pp. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. $14.25.

WINDOWS AND GLASS IN THE EXTERIOR OF BUILDINGS—176 pp. Publications Office, National Academy of Sciences, 2101 Constitution Ave., Washington, D. C. $5.00.

HOUSING IN ISRAEL—256 pp. J. Pincover, 602 W. 157th St., New York 32. $4.00.

HANDBOOK OF STANDARD STRUCTURAL DETAILS FOR BUILDINGS—by Milo S. Ketchum. 120 pp. Prentice-Hall, Inc., 70 Fifth Ave., New York 11. $4.65.

PLASTIC DESIGN OF PORTAL FRAMES—by Jacques Heyman. 104 pp. Cambridge University Press, 32 E. 57th St., New York 22. $2.00.

ASTM STANDARDS ON CEMENT—272 pp. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $3.00.

NOMOGRAMS FOR THE ANALYSIS OF FRAMES—by J. Rygol. 53 pp. Concrete Publications, Ltd., 14 Dartmouth St., London, S.W. 1, England. $4.00.

PRACTICAL ACCOUNTING AND COST KEEPING FOR CONTRACTORS—255 pp. Frank R.

ROUND CONCRETE COLUMNS SUPPORT MULTI-STORIED SHOPPING CENTER

Bergen Mall Shopping Center, Route 4, Paramus, N. J. Architect: John Graham & Co., Architects Engineers, New York and Seattle. Contractor: Corbetta-Pavarini

Low cost, easy-to-handle

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The huge new Bergen Mall Shopping center contains hundreds of round concrete supporting columns formed by Sonoco SONOTUBE Fibre Forms.

Contractors everywhere have learned that these low-cost fibre forms provide the quickest, most economical method of forming round columns of concrete.

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Walker Co., 173 West Madison St., Chicago 2, Ill. $5.00.

MODERN MASONRY—163 pp. Building Research Institute, Division of Engineering and Industrial Research, 2101 Constitution Ave., Washington 25, D. C. $4.50.

SYMPOSIUM ON TENSION TESTING OF NONMETALLIC MATERIALS—82 pp. American Society for Testing Materials, 1916 Race St., Philadelphia, Pa. $2.00.

CRSI DESIGN HANDBOOK—447 pp. Concrete Reinforcing Steel Institute, 38 S. Dearborn St., Chicago 3, Ill. $6.00.

FUNDAMENTALS OF STATICALLY INDETERMINATE STRUCTURES—by Prof. Carl L. Shermer. 264 pp. Ronald Press Co., 15 E. 26th St., New York 10. $6.50.

THE FIGHT FOR FLUORIDATION—by Donald R. McNeil. 241 pp. Oxford University Press, 114 Fifth Ave., New York. $5.00.

PRINCIPLES OF ENGINEERING GEOLOGY AND GEOTECHNICS—by Dimitri P. Krynine and William R. Judd. 730 pp. McGraw-Hill Book Co., 330 W. 42nd St., New York 36. $10.00.

RAINFALL RELATIONS ON SMALL AREAS IN ILLINOIS—Bulletin 44. By F. A. Huff and J. C. Neill. State Water Survey Division, State of Illinois, Urbana, Ill.

FIFTEEN-YEAR EXPOSURE TEST OF PORCELAIN ENAMELS—Building Materials and Structures Report 148. By Dwight G. Moore and William N. Harrison. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. 15¢.

INVESTIGATION OF THE IMPROVED CARLSON STRESS METERS—Technical Report No. 6-454. Director, Waterways Experiment Station, Corps of Engineers, Vicksburg, Miss. 75¢.

MULTIPLE REGRESSION TECHNIQUE APPLIED TO DIMENSIONAL ANALYSIS—13 pp. E. A. Elevatorski, 2718 Imperial St., Salt Lake City, Utah. 25¢.

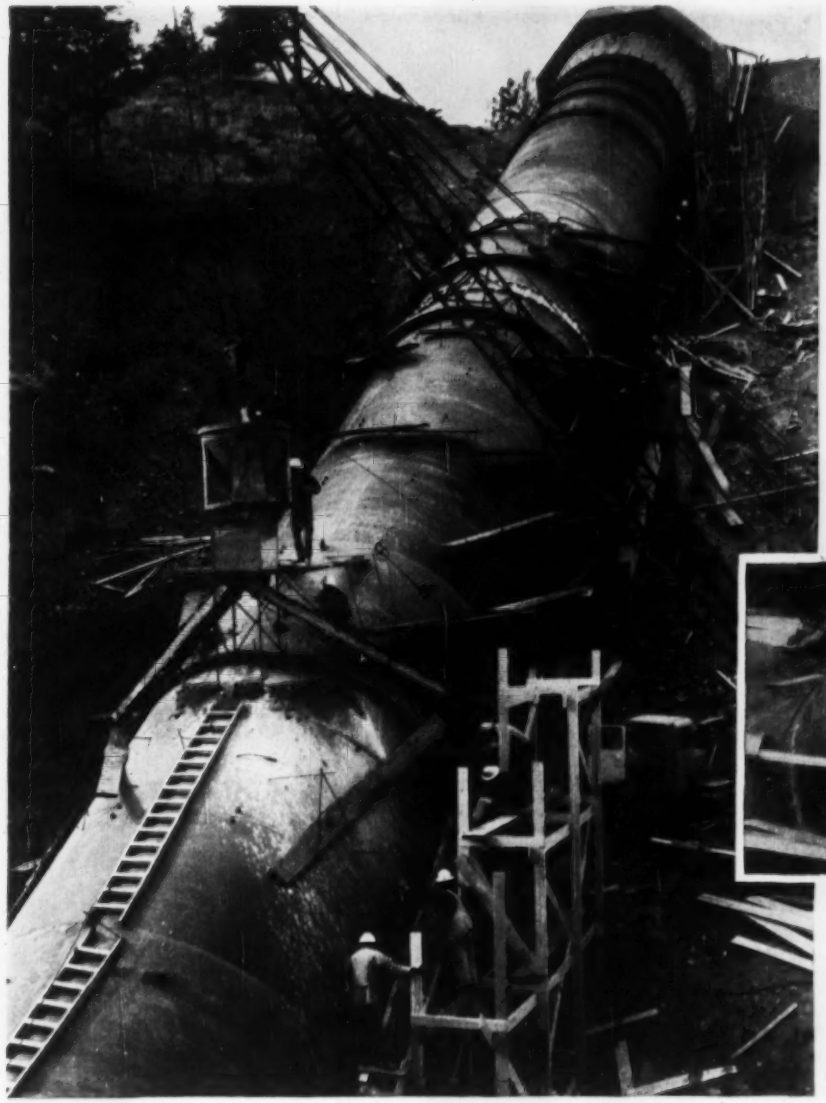
INDIANA WATER RESOURCES—Report and Technical Appendix. Indiana Water Resources Study Committee, Indianapolis, Ind.

SEWERAGE AND SEWAGE DISPOSAL—by L. B. Escritt. 427 pp. Contractor's Record Limited, Lennox House, Norfolk St., Strand, London, W.C 2, England. 45s.

ELEMENTARY THEORY OF STRUCTURES—387 pp. McGraw-Hill Book Co., 330 W. 42nd St., New York 36. $7.50.

A GLOSSARY OF TERMS IN NUCLEAR SCIENCE AND TECHNOLOGY—No. 110. 1957. 188 pp. The American Society of Mechanical Engineers, 29 West 39th St., New York. $5.00.

SETON CREEK PENSTOCK



The Seton Creek hydroelectric project is the third major power development in British Columbia in the past few years to use Dresser Penstock Couplings. View above shows workman bolting up the giant coupling.

Coupling at Seton Creek had to have give and take!

At the Seton Creek hydroelectric project in British Columbia, this huge 218″ OD penstock was engineered to flex with the ground, to contract and expand with temperatures varying as much as 120°.

The 3-section Dresser Penstock Coupling was used to flex *with* this movement while providing a bottle-tight joint under a design pressure of 55 psi. (Segmental-type couplings can be designed to withstand much higher heads.)

The middle ring, made of 1¼″ ASTM, A285 steel, was segmental type and field welded at the job site. With this in place, wrenches were the only tools needed to secure the segmental ⅝″ wall cast steel followers. (See photo inset above.)

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Dresser Penstock Couplings are engineered for pressures and other factors of individual penstock projects. For valuable engineering data on other successful Dresser-coupled steel penstock installations, send for illustrated penstock brochure. Write: Dresser Manufacturing Division, Bradford, Pa. Sales offices in: New York, Philadelphia, San Francisco, Chicago, Houston, Denver, Toronto and Calgary.

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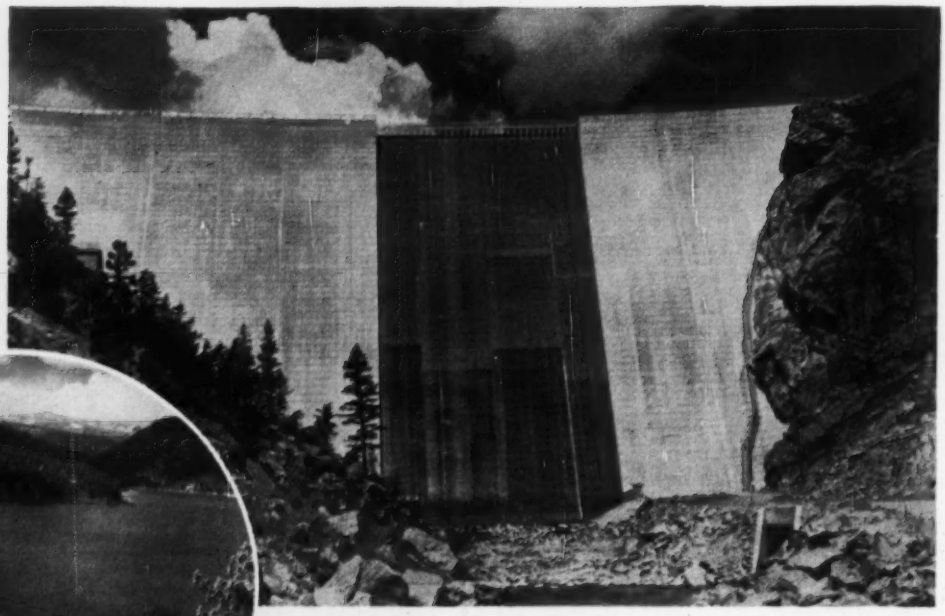

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Charles Pierce Made Assistant Director CGS

Charles Pierce has been sworn in as Assistant Director, Coast and Geodetic Survey, Department of Commerce, after having been nominated by President Eisenhower and confirmed by the Senate with the rank of rear admiral.

A 1922 civil engineering graduate from Tufts College, Mass., Admiral Pierce has been with the Survey for 34 years.

Prior to his new appointment, he served for about 18 months as chief of the Geodesy Division of the Washington office. In addition to his many field assignments along the coasts of the U. S., Alaska and the Philippines, Admiral Pierce has had command of the surveying ships, the Pathfinder and the Pioneer.

Rescue by Helicopter

District Engineer and pilot pull 17 off sunk dredge

On Sept. 10 the Corps of Engineer seagoing dredge, William T. Rossell, was rammed by an outgoing freighter and sank in the channel at the entrance of Coos Bay Bar on the Oregon coast. Two men who played the big part in rescuing 17 men left clinging to masts and rigging after the others had escaped in lifeboats were Col. Jackson Graham, Portland District Engineer, and his helicopter pilot, Wesley C. Lematta of Portland.

Only a few hours before the accident the colonel had presented the 57 officers and men of the Rossell with a plaque in recognition of a two year safety record, and was on the point of returning to Portland. Airborne, Colonel Graham and Mr. Lematta spotted the ships just after the collision had occurred.

The helicopter first followed the drifting body of one of two men killed in the accident to point it out to the Coast Guard, then returned to the ship for rescue operations.

Flying back and forth between dredge and beach, the helicopter picked up the stranded survivors, with Colonel Graham handling the rescue sling on about 10 of the trips. On one occasion, the pilot had to take the helicopter under guy lines of the dredge to get in position for a rescue.

After the job was done, Colonel Graham observed that had the helicopter not been readily available, many of the rescued men undoubtedly would have died.

Both the Corps and Coast Guard have set up boards of inquiry into the collision, which resulted in, beside the two men killed, one man missing, another dead from a heart attack after being rescued and seven men requiring hospitalization.

Pilot for the freighter, the Thorshall, is reported to have said that the freighter failed to answer her helm and coasted into the dredge even after engines had been put into full reverse.

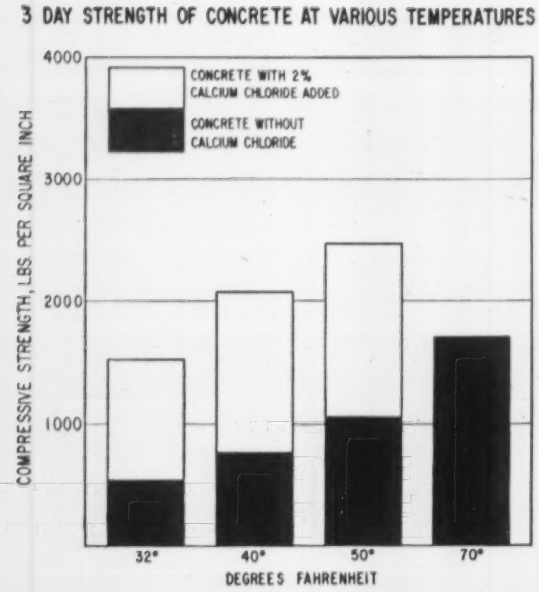
RETIRED RECLAMATION official, Clyde H. Spencer (right) turns over Region II directorship to Bernard P. Bellport.

Clyde Spencer Leaves Reclamation Post

Clyde H. Spencer, director of Sacramento Region II, U. S. Bureau of Reclamation, has retired after 4 years in his present job and 38 years with the Bureau. A few days after his retirement he was named by the Sacramento Municipal Utility District as project manager on the district's soon-to-start $85 million Upper American River power and water supply project.

A proponent of the $1.5 billion Feather River Project and the $225 million San Luis Project, among others, Mr. Spencer emphasized the need for more water projects for California in reviewing his tenure with the Bureau. During his directorship, work was started on Trinity Dam and Ventura Project and water developments in Santa Barbara County.

Named to succeed Mr. Spencer is Bernard P. Bellport, Bureau engineer for 20 years. He has been construction engineer at Monticello Dam and on the Solano Project's canal system.



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* From Highway Research Board Proceedings

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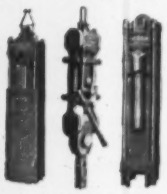

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Obituaries

Prof. Lowell O. Stewart, 62, head of the civil engineering department at Iowa State College, died Aug. 24, after a heart attack suffered in Chicago where he had been interviewing prospective staff members for the college. He received his B.S. degree in civil engineering at Michigan State College in 1917 and came to Iowa State College as an instructor in 1924. He received his master's degree at Iowa State in 1927 and was made head of the department of civil engineering in 1938. He was acting dean of engineering in 1946 and 1947.

Fred F. Goodhart, 69, died Aug. 19. He was a graduate of Dickinson College and served as an engineer for 25 years with the Pennsylvania State Highway Department.

Ernest A. White, 69, civil engineer of Tacoma, Wash., died Aug. 24. Mr. White was with the Pierce County engineer's office from 1915 until 1923 and again from 1933 until his retirement in June of this year, as assistant county engineer and also as acting county engineer. He was with the Washington State Highway Department from 1923 to 1933.

Leonard Kik, 56, president of the Kik Construction Co., Lyndon, Ky, died Aug. 30. A native of Grand Rapids, Mich., he was a graduate of Purdue.

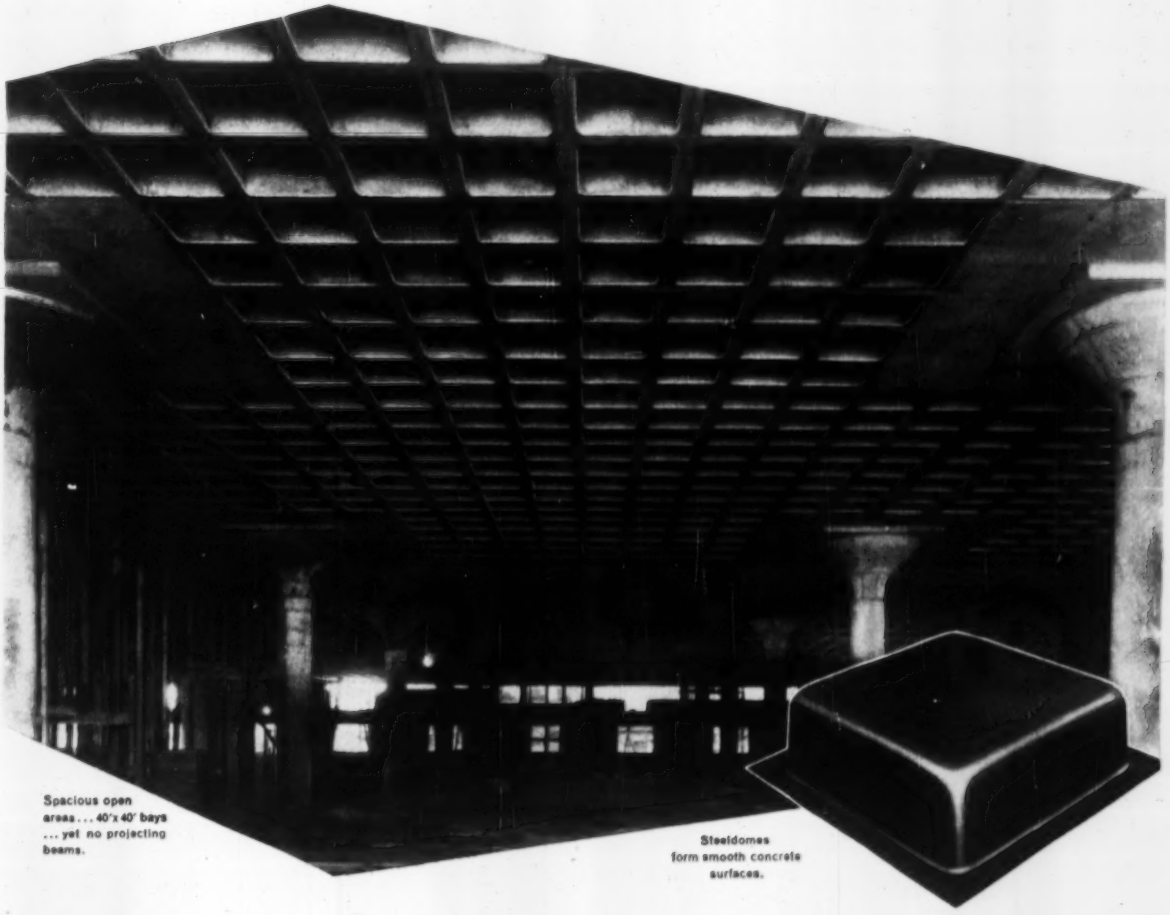
Roland E. Stoelting, 73, a former city commissioner of public works in Milwaukee, Wis., and retired civil engineer, died Sept. 2 in Milwaukee. He was associated with the city 26 years and was a graduate of the University of Wisconsin.

Harold P. Burrell, New York district manager for C. L. Guild Construction Co., Inc., East Providence, R. I., died Sept. 1 in Darien, Conn. Mr. Burrell was a member of the Moles and a heavy construction man associated principally with piledriving work.

Marcus M. Doerhoefer, 71, a Kentucky state highway engineer for 30 years, died Sept. 7 in Louisville. He had retired from the highway department in May, 1957.

William T. Savage, Jr., 32, a civil engineer with Albright & Friel, Inc., Philadelphia consulting engineers, died Aug. 25. A graduate of Drexel Institute of Technology, he also held a master's degree from the University of Pennsylvania.

EXPANSIVE?—YES EXPENSIVE?—NO



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Steeldomes form smooth concrete surfaces.

CECO STEELDOME CONSTRUCTION

Wide 40′ x 40′ bays can be built with savings up to 30%

How to get wide open space in buildings and yet meet a budget is a problem faced by architects and structural engineers. This is difficult to achieve—but there is a solution—two-way slab construction formed with Ceco's new one-piece Steeldomes.

Employing this method, 40′ x 40′ bays supporting 150 lb./sq. ft. live load were built economically through the teamwork of Friedman, Alschuler & Sincere, architects-engineers, and contractor Wm. E. Schweitzer in constructing the plant and warehouse for Crescent Industries, Inc., Niles, Ill. A pilot study showed Ceco Steeldome construction was the most economical of all. Savings up to 30% were indicated.

Dome construction is essentially flat slab design with voids. The voids reduce deadload—the joists provide rigidity. Erection is fast and economical, on simple one-way open wood centering. With Steeldomes, the exposed waffle pattern presents a high-quality finish. Added to that, you get the advantages of wide open space and lower cost. On the Crescent project Ceco also supplied reinforcing steel and hollow-metal doors and frames. Ceco Steel Products Corporation. Sales offices, warehouse and fabricating plants in principal cities. General Offices: 5601 West 26th Street, Chicago 50, Illinois.

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IN CONSTRUCTION PRODUCTS CECO ENGINEERING MAKES THE BIG DIFFERENCE

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- Texas Surveyors Association
  October 7-9, 1957
  Austin, Tex., Hotel S. F. Austin, Booth 30/31

- American Society of Civil Engineers
  October 14-18, 1957
  New York City, Hotel Statler, Booth 11/12

Road Connection to Virginia Bridge-Tunnel

This highway connection to the Hampton Roads Bridge-Tunnel between Hampton and Norfolk, Virginia on Willoughby Spit is for the Department of Highways, Commonwealth of Virginia, F. A. Davis, chief engineer, S. F. Stephens, highway contract engineer. Contract for $478,795 went to E. V. Williams Co., Inc., Norfolk and W. H. Scott, Inc. Franklin, Va. on a low bid 2½% under the second bidder.

Wage scales on this job include: common or unskilled labor $1.10, truck drivers $1.15, concrete finishers $1.75, shovel or crane operators $2.20 and tractor operators $2.25.

The two lowest bidders were:

1C E. V. Williams Co., Inc., Norfolk, Va., & W. H. Scott, Inc., Franklin, Va $487,795
2 George M. Brwester & Son, Inc., Bogota, N. J. 490,726

Bids: 3-20-57 Items	Unit	Quantity	Unit Prices 1C	2
Clear & grub	ls	job	$2,500	$18,000
Excavation, regular	cy	30,252	1.20	1.10
borrow	cy	10,684	1.65	2.00
Subgrade treatment, 6"	sy	46,235	1.35	1.25
Base crse, soil aggr, 8"	sy	2,866	2.00	2.00
Bituminous matl, RC-2	gal	1,720	0.25	0.25
Cover aggr No. 9	t	43.01	8.00	7.00
No. 11	t	43.01	8.00	7.00
Pavement, RCC, 8"	sy	42,877	5.70	5.80
Plain CP, culv, 24"	lf	24	6.50	10.00
RCP, culv, 15"	lf	345	4.50	4.50
18"	lf	471	5.50	5.50
24"	lf	3,396	9.00	8.50
30"	lf	30	14.00	14.50
36"	lf	123	18.00	16.00
72"	lf	51	55.00	46.00
Endwall, std, EW-1	cy	12.28	95.00	125.00
EW-2	cy	12.81	95.00	125.00
Conc, cl A, for box culv incl wingwalls	cy	133	115.00	125.00
Steel, reinforcing	lb	16,915	0.23	0.15
Underdrain, CP, porous, 8"	lf	2,005	2.50	2.00
combination, CD-1	lf	522	2.00	2.00
CD-2	lf	195	2.00	2.00
Drop inlet, curb, std, DI-2	ea	27	250.00	300.00
MH, std, MH-1	ea	3	300.00	900.00
Obscure old road	sy	180	1.00	1.50
Guard rail, stl beam, GR-1	lf	4,530	5.00	4.20
Topsoiling, cl B, 2"	ac	9	700.00	650.00
Seeding	ac	9	400.00	350.00

To be completed: 10-31-57

Alternate on Sewer Bids in Maine Includes Jacking

Separate storm and sanitary sewers, a force main and two pumping stations for Westbrook, Me. involve five railroad spur crossings, one 28 ft deep where traffic cannot be interrupted. The contract to Sam Aceto & Co., Portland, Me. for $134,590, a combination of base and alternate bids, is around 3% under the estimate. Edward C. Jordan Co., Inc., Portland is the engineer.

The alternate bidding pits transite pipe against vitrified, reinforced concrete sewer pipe and against extra strength reinforced concrete culvert pipe. On the force main Class 100 transite pressure pipe is bid against AWWA Class A bituminous coated cast iron pipe. Brick competes with precast concrete on manholes and catch basins.

The job included some 2,100 lin ft of sanitary sewer ranging from 8 to 15 in., 2,300 ft of storm sewer ranging from 12 to 36 in., 1,200 lin ft of force main from 4 to 10 in. in size and one 400-gpm and one 75gpm pumping station. The 36 in. reinforced concrete culvert pipe has to be jacked for about 115 ft at 28 ft depth under an industrial spur track where traffic must be maintained. On this the engineers will accept a 48 in. corrugated metal tunnel liner plate with a 36 in. bituminous coated corrugated metal pipe inside and portland cement grouting. The 240 ft stretch of 36 in. RC pipe is layed at depths of 23 to 28 ft under an old dump area. Subsurface conditions are poor at the 400-gpm pumping station, with soft wet marine clay expected. The inaccessible site requires putting in 400 ft of road.

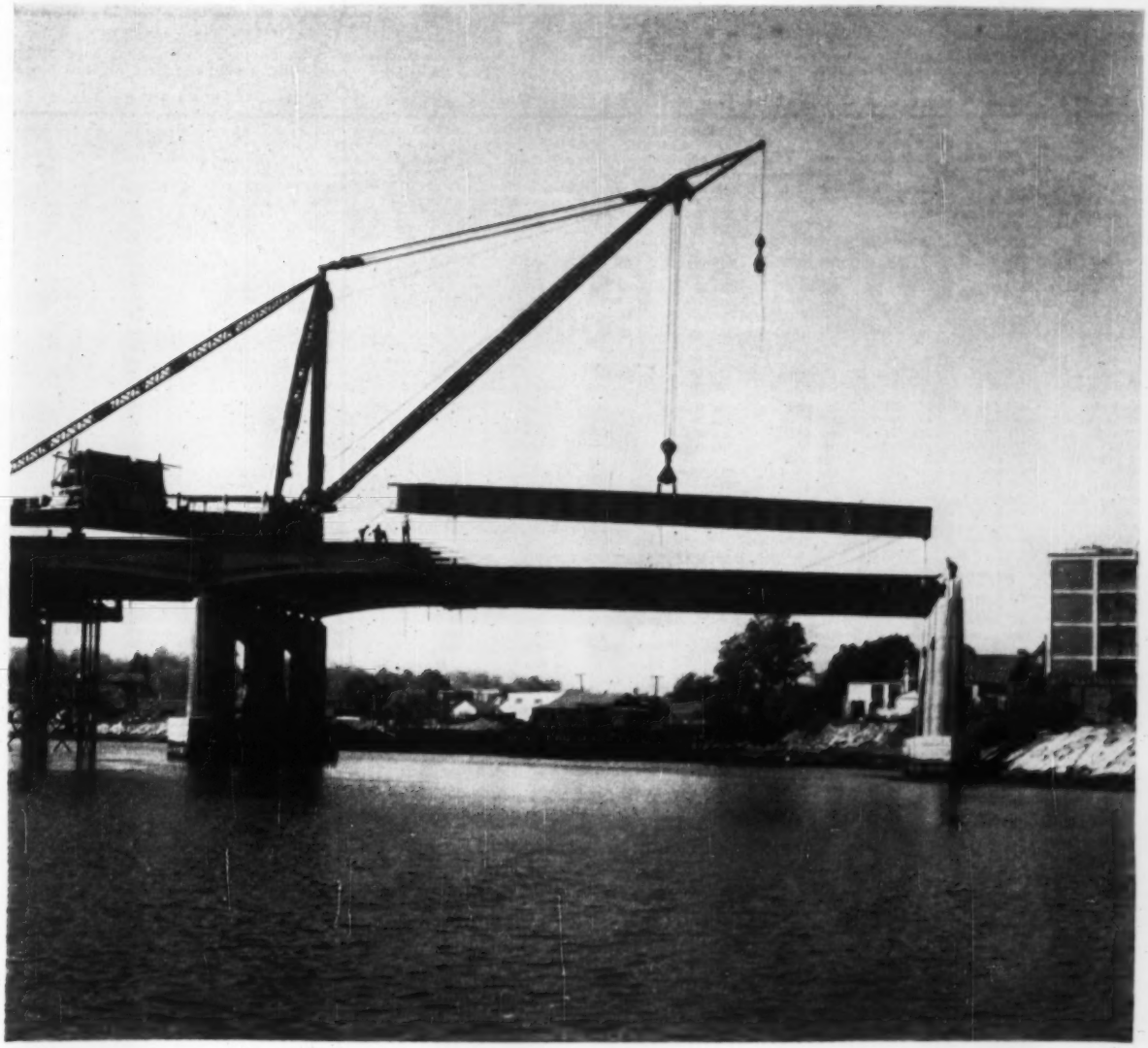
The contractor furnishes all materials. Wage scales in effect on the job include: common or unskilled labor at $2.10 per hour, carpenters $2.70, masons $3.35, tractor and excavator operators $3.40.

The three bidders were:

1C Sam Aceto & Co., Portland, Me. $136,090 Bid $134,590
2 Ralph Romano Jr., Inc., Portland, Me 150,889
3 C D'Alfonso, Portland, Me 155,535
EE Edward C. Jordan Co., Inc., Portland, Me 140,120

Bids: 8-8-57 Items	Base	Alt	Unit	Quantity	Unit Prices 1C Base	1C Alt	2 Base	2 Alt
Sewer 8" VCP	TP		lf	510	$3.00	$3.20	$1.35	$1.60
10"			lf	280	3.50	4.20	1.90	2.73
15" VCP	14" TP		lf	1,560	5.00	5.80	3.75	3.80
12" RCP	TP		lf	980	3.80	4.00	2.45	3.20
18" RCP			lf	50	4.50		4.00	
	TP		lf	260		6.00		5.50
20" RCP			lf	465	6.00		5.30	
	TP		lf	255		7.00		7.00
24" RCP	TP		lf	295	7.00	8.50	7.45	9.00
Wmain 4" CIP	TPP		lf	750	2.50	2.00	2.50	1.40
10" CIP	TPP		lf	415	8.00	6.80	7.00	3.30
Culv 36" RCPES	TPc III		lf	240	14.00	22.00	13.50	21.00
Lay 36" pipe under St			lf	115	70.00		120	
MH und 13'	Brk	Pcst C	vf	260	40.00	35.00	64.00	46.00
MH under 30'		Pcst C	vf	55	40.00		43.00	
CB	Brk	Pcst C	ea	4	450	400	511	475
Exc & back-fill			cy	3,100	3.50		7.50	
Exc below grade			cy	unk	10.00		10.00	
in trnch, sheeted			cy	3,100	7.20		8.00	
ledge			cy	unk	25.00		25.00	
Gravel, screened	p		cy	700	5.50		4.00	
Select bkfl for P	p		cy	3,100	1.50		1.30	
Hvy grav, below grd	p		cy	unk	2.50		2.50	
Gravel, rd	p		cy	600	2.00		1.90	
Shtg, trench lip			Mbf	unk	175		175	
Pump station 1			ls	job	16,700		13,600	
2			ls	job	9,000		9,650	
Pump, 5" dis 400 gpm	f&i		ea	2	2,000		1,675	
60 gpm	f&i		ea	2	1,750		1,464	
Motor gen set 15 kw	f&i		ls	job	3,200		3,017	
5 kw	f&i		ls	job	2,000		1,782	
Piles			lf	500	4.00		3.50	
Remov rock or conc in tunnel			cy	unk	25.00		25.00	
House connections			lf	100	4.00		4.50	
Headwall & approach		1	ls	job	1,200		592	
		2	ls	job	1,100		547	
Base bid					$136,090		$150,889	
Alternate					$138,151		$147,694	

Completion Schedule: 200 working days
Liquidated Damages: $40 per day



WIRE ROPE AT WORK

The Roy C. Smith Bridge over the Neponset River, near Milton, Massachusetts, is an important link in Greater Boston's expanding new system of expressways. Because of its high level, this streamlined bridge is the only Neponset River crossing between Milton and the Bay that is not subject to navigational openings.

Construction involved the placing of some heavy plate girders, and the photograph shows one of them being lowered into position. The girder is 106 ft long and weighs approximately 34 tons. Handling of the load was entrusted to strong, flexible Bethlehem wire rope, Purple Strand grade—a top-quality rope that makes even the touchiest jobs seem routine.

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See following ENR issues for OTHER PRICES

- Cement, Aggregate, Ready-mixed Concrete, Asphalt: Last, Sept. 5; Next, Oct. 10
- Iron and Steel Products, pipe: Last, Sept. 12; Next, Oct. 17
- Wood Products, Glass, Explosives, Chemicals: Last, Sept. 19; Next, Oct. 24
- Clay Products, Lime, Plaster, Paint, Roofing: Last, Sept. 26; Next, Oct. 31

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

	STRUCTURAL CLAY TILE PARTITION—SCORED Per M. lots of 2,000 pieces or over,			STRUCTURAL CLAY TILE—LOAD BEARING—SCORED Per M. lots of 2,000 pieces or over,			BRICK Per M. in quantity		LIME Per ton, in paper, Carload lot,		
	3x12x12 in.	4x12x12 in.	8x12x12 in.	8x12x12 in.	10x12x12 in.	12x12x12 in.	Common backing	Straight hard	Hydrated finishing	Common hydrated	Pulverized or lump
Atlanta	$149.90p	$149.90p	$299.80p	$334.55p	.....	.....	$30.50p	$32.70p	$23.50	$24.50	$.....
Baltimore	203.00	217.00	406.00	485.50	596.00	681.00	36.00k	41.00k	33.00	22.00	.....
Birmingham	135.00p	152.00p	.....	303.00p	376.00p	455.00p	27.00ff	38.00gg	35.02	22.30	26.33B
Boston	220.75†	235.56†	441.75†	529.50†	.....	.....	41.50p	46.50p	39.20†	31.20†	.....
Chicago	135.00	145.00	280.00	.....	.....	.....	30.00	32.00	38.00	35.20o	.....
Cincinnati	205.00j	225.00j	296.00jdd	213.00j	288.00j	314.00j	45.75j	47.00j	30.04j	28.04j	30.04j
Cleveland	209.00	223.00	.....	475.00	.....	.....	43.00	47.00	31.00	25.00	.....
Dallas	152.00	152.00	300.00	364.50	446.25	552.50	26.75	45.00	41.60	25.08	27.65
Denver	.....	.....	.....	.....	.....	.....	31.50	47.50	45.00p	42.00p	46.00p
Detroit	273.00	298.00	545.00	.....	662.00	755.00	47.50p	48.00p	38.00	30.00	.....
Kansas City	158.00	158.00	312.00	312.00	400.00	500.00	33.00	33.00	36.26	34.26	29.76
Los Angeles	r	r	r	r	r	r	32.50§	.....	38.00	38.00	39.00
Minneapolis	188.00p	210.00p	429.00p	210.00pw	.....	.....	48.00rp	52.50ii	46.00bbe	36.00bbe	48.00bbda
Montreal	170.00au	178.00au	325.00aus	270.00q	400.00q	.....	42.00C	49.00C	39.00	22.00	13.25
New Orleans	186.00	186.00	380.00	380.00	.....	.....	40.00	55.00	44.00	32.00	32.00P
New York	158.10A	168.60A	231.70cA	233.90An	.....	.....	44.00	.....	37.00	35.00	.....
Philadelphia	169.00	180.20	337.00	405.00	.....	.....	36/34	38/42	27.80	25.80	3.17m
Pittsburgh	147.50A	157.75A	295.00A	335.00A	435.00A	500.00A	39.00A	46.00A	32.00A	28.00A	.....
St. Louis	178.50p	185.00p	391.00p	401.00p	459.00	621.50	43.00l	41.50	0.95aa	.80aa	1.35s
San Francisco	156.85*	177.10*	235.30dd*	.....	.....	.....	42.50*	42.50*	27.75	27.75	30.50t
Seattle	225.00p	250.00p	450.00p	250.00pre	.....	.....	43.00	57.00	52.00bb	40.00bb	4.50mbb
Toronto	146.00	157.00	289.00	234.00f	395.00	.....	30.00	63.00	36.00	33.50	31.50

§ F.o.b. yard. *r F.o.b. plant Stockton. †f F.o.b. yard Roxbury. *a Smooth. *p Truck lots. *q Provincial and Municipal tax extra. *r Not used; earthquake danger. *h Per 50 lb bags. *c 8 x 12 x 12 in.-3 cell. *d Pulverized hot. *e 8⅝, 10th following month. *f 8 x 8 x 12. *g 8½ x 8 x 12. *h F.o.b. trucks, job site N.Y.C. *i 60-lb. sacks. *j Truck load or over. *k $1.00 discount. *l Red face. *m Per bbl., 180 lb. processed. *n 7¾ x 7¾ x 12. Speed tile. *o mason's double hydrated pressure. *s 8 x 16 x 12. *t 1½ x 8 x 11¼. *u Incl. Federal tax. *v Sand lime. *w 5 x 8 x 12 *y Stacked. *z Pebble; 80 lb. sack. *aa 50 lb. sack. *bb LCL. *dd 6 x 12 x 12 $26.72 *ff 80% common. *gg Rough, $40.00 Smooth. *ii Chi common. *A 2% cash. *ll lumps, *C $4.50 for del.

PAINT, ROOFING—F.O.B. CARLOAD LOTS

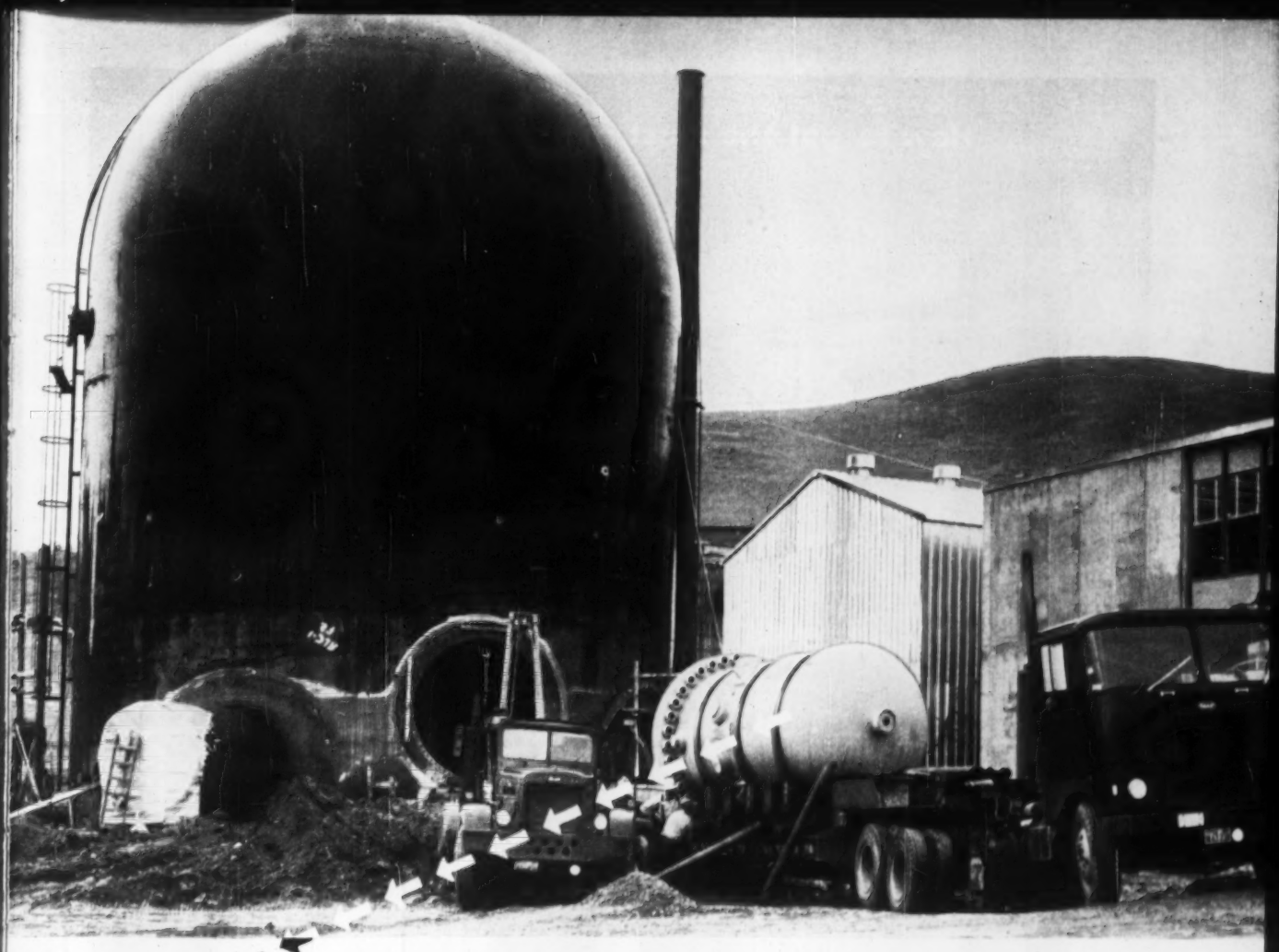
	RED LEAD Per 100 lb. in 600-lb. (Approx.) bbl. Dry a	WHITE LEAD Per 100 lb. in 100 lb. cases In oil w	READY-MIXED PAINT Per gal., drums Graphite b	Aluminum c	Ferric Oxide d	ROOFING SUPPLIES; Carload lots f.o.b. factory Rolls, slate surfaced, 85-90 lb. per sq.	Asphalt felt, per 100 lb.	Tar felt, per 100 lb.	Asphalt coating per gal.	Tar pitch 380 lb. bbl. per ton
Atlanta	$16.50	$30.125	$3.50	$3.88	$3.81	$3.39	$2.20	$2.62	$0.67	$57.75
Baltimore	16.25	29.75	3.00	4.40	3.50	2.78	4.25	4.25	.48	50.18
Birmingham	16.50	30.125	3.90	3.40	.....	3.09	2.29ii	2.29ii	.82ff	45.00ee
Boston	16.25	29.75	.....	.....	.....	3.63gg	2.83eg	2.83eg	.50g	58.00g
Chicago	16.25	29.75	.....	.....	.....	3.69lu	2.98le	2.98le	46.00lbbe	55.70l
Cincinnati	16.25	29.75	.....	.....	.....	3.13	2.70	2.73	.428y	55.96
Cleveland	16.25	29.75	2.40ppg	2.60gg	2.80gg	3.73q	2.85o	2.85o	.501y	47.00pg
Dallas	16.50	30.50	.....	3.13B	.....	3.00u	3.00o	3.00o	.464	65.00AA
Denver	16.75	30.25	3.29	5.15	3.04	2.89	2.10e	2.40e	.48ff	50.00
Detroit	16.25	29.75	2.70	3.95	2.70	3.30	2.54f	2.409f	.85¢ff	47.30
Kansas City	16.25	30.50	3.94	3.38	2.96	3.71ii	2.85o	2.85o	.884y	.....
Los Angeles	16.25	30.00	3.30n	4.50n	4.20n	3.20n	2.15en	l	.70ny	l
Minneapolis	16.25	29.88/29.75	.....	.....	.....	2.99	2.41hi	2.41hi	.442i	50.00r
Montreal	.....	.....	5.03Dffl	5.94Effl	4.65Ffl	5.40	4.65f	4.65f	1.60	.....
New Orleans	.....	.....	.....	.....	.....	2.74	2.18	2.43	0.689	.....
New York	16.25C	29.75	.....	.....	.....	3.19	2.45o	2.45o	.425s	49.00*
Philadelphia	16.25	29.75	3.60	3.40/3.65	3.50/4.60	3.00/3.30	2.54o	2.54o	.37/.45	48/54
Pittsburgh	16.25	29.75	2.10tG	2.25tH	2.25tI	3.37s	2.59s	.....	.45	.....
St. Louis	16.25	29.75	.....	.....	.....	3.70xis	2.75kk	2.75kk	.46ny	64.00
San Francisco	16.25	30.00	3.20	4.30	3.50	2.69	2.09aa	3.10	.47yy	54.00
Seattle	16.25	30.25	3.47ee	4.19ee	.....	3.72qee	3.22hee	.....	.50ee	47.20ee
Toronto	.....	.....	.....	.....	.....	4.45	4.10e	4.65o	1.70j	88.00A

*t Delivered. * Note: Red lead in oil 50¢ higher than white lead in oil. *e Aver. wt. approx. 425 to 550 lbs drums. *a Red lead prices change frequently due to pig lead price changes. *b U. S. War Dept. Spec 3-49A. *c ASTM Spec. D266-31. *d 80% minimum ferric oxide. *e 15 lb. *f Per 432 sq. ft. *g F.o.b. yard, Roxbury. *h Per roll, 65 lb. *i Net carload lot prices; Minneapolis and vicinity. *j 45 gal containers. *k Per cwt. *l Not used. *n F.o.b. city. *o Per 60-lb. roll. *p 6-drum, 50 gal. ea. *q Per 90-lb. roll. *r F.o.b. factory, Chicago. *s Truckload. *t Incl. Federal tax. *u Per 90-lb. square. *v Per ton. *w Price to contractors $1.25 less. *x Mineral surfaced. *y 55-gallon container. *z Drums. *aa 15 lb., 324 sq ft roll. *bb Roofers coating and cement; *cc LCL, truck delivery. *ee Asphalt pitch in 100 lb. package. *ff 5-gal. drums. *gg F.o.b. factory. *hh Incl. freight. *ii Per roll. *jj Asbestos roof coating. *A 400 lb barrels. *B ASTM Spec D-962-49 *C 95%. *D Std. Black. *E Ready-mixed. *F Over 80% ferric oxide. *g Mitt. Spec: G, TTP27; H, TTV81; I, TTP31.

PLASTER, VERMICULITE AND METAL BUILDING SHEETS & TUBING

	PLASTER† Neat per ton	PLASTER† Gauging per ton	VERMICULITE† Home Insulation pellets	VERMICULITE† Plaster aggregate	VERMICULITE† Concrete Aggregate Untreated	PERLITE† Plaster Aggregate	PERLITE† Concrete Aggregate Untreated	ALUMINUM SHEETh† Flat .102" th 36"x96" & 48"x144" per lbjt	ALUMINUM SHEETh† Corr roof .032" th 35"x12' per shu	STAINLESS STEEL† SHEET-TYPE 302g 20 ga 48"x96"-120" per cwthh	STAINLESS STEEL† SHEET-TYPE 302g 28 ga 36"x120" per cwtmm	COPPER WATER* TUBING-TYPE L 2000 ft lots per ft ¾"b	COPPER WATER* TUBING-TYPE L 2000 ft lots per ft ½"e
			per bag of 4 cu ft										
Atlanta	$31.00	$36.00	$1.55s	$1.65s	$1.80sl	$1.65	$1.65	$0.422n	$8.97n	$61.44n	$67.50	$16.74f	$23.41f
Baltimore	23.25	33.65	0.95	1.15	1.15	1.15	1.65	0.431	0.489r	56.25	64.25	0.1674	0.2341
Birmingham	33.00	39.00	1.55	1.55	1.80l	1.55	1.55	0.466	10.02	67.34	76.09	0.1608	0.2249
Boston	22.00	30.00	1.40	1.40	1.45	1.45	1.50	0.446	28.50p	65.39dd	71.84ddff	0.1608	0.2249
Chicago	26.80	26.80	1.55	1.60	1.60l	1.50	1.50	0.506z	10.376a	65.15aee	73.90aee	0.1608	0.2249
Cincinnati	28.00*	28.00*	1.75	1.75	1.75	1.85	1.90	0.434	9.56	65.03	71.28ff	0.1591	0.1911
Cleveland	26.50	43.00	1.13k	1.16ii	1.24l	1.45	1.45	0.506aa	8.66	67.83	76.58	16.08f	22.49f
Dallas	30.00	32.00	1.05	1.21	1.37l	1.21	1.32	0.474	0.5100r	66.59	80.00	0.200	0.2810
Denver	25.00	25.00	1.50	1.40	1.50	1.40	1.55	0.462	10.18	66.30gg	74.80gg	0.2006	0.2810
Detroit	25.00	25.00	1.28	1.32	1.41	1.45	1.45	0.456a	10.376a	65.15a	73.90a	13.30f	24.78f
Kansas City	30.00	35.00	1.29	1.45	1.48l	1.40	.....	0.444	11.40	67.50	76.25	16.08f	22.49f
Los Angeles	26.20	27.20	1.25k	1.15k	1.25	.95	1.10	0.506	10.543d	62.10	75.85	0.1674	0.2341
Minneapolis	32.00	32.00	1.55	1.60	1.80	1.40	1.40	0.503	14.25w	66.21	74.71ff	0.1556	0.2171
Montreal	27.60oo	35.60oo	1.20	1.40	1.50	1.15e	1.15e	0.437	9.92	66.50	.....	0.228	0.287
New Orleans	32.00	45.00	1.25	1.25	1.25	1.25	1.25	0.464	8.303	62.04	70.54	0.1899	0.2658
New York	24.00	30.00	1.35	1.30	1.50	1.40	1.40	0.501a	10.14ad	68.58	77.33	15.56f	21.71f
Philadelphia	23.25	32.00	1.35	1.35	1.40l	1.05	1.05	0.44aw	9.46a	66.68a	75.77a	20.00f	26.00f
Pittsburgh	28.00nn	28.00nn	1.60nn	1.50nn	1.35	1.50	1.65	0.456	9.83	63.41	76.18	0.1403	0.1768
St. Louis	29.00	40.00	1.35	1.60jj	1.55	1.60	1.60	0.492	10.37	70.86	77.36y	16.08m	22.49fm
San Francisco	27.85	32.00	1.20	1.20	1.30	1.20	1.30	0.505	9.13	64.95	73.45	0.1608	0.2949
Seattle	41.00	44.00	1.45	1.25k	1.85l	1.50k	.....	0.506	9.964	63.00	83.00	0.1608	0.2249
Toronto	28.50	45.50	1.20	1.30	1.45l	.....	1.55	0.4095	24.09ae	73.74	86.52	0.2768	0.3347p

‡trucklots, delivered †fob warehouse *fob city *adelivered *b½" O.D. *c⅝" O.D. *d 0.100"th *e 34" x 80" sheet *f per 100 ft *g5 tons & up; cold roll, anneal & pickled; 2B finish *h 15M lb lots *j 1100 & 3003 alloy, mill finish *k bag of 3 cu ft *l treated with air entraining agent *m 2-10M ft *n fob mill, fr allow *p 100 sq ft *r per lb. *s 30 lb bag *t 36" x 96;-10.81 lb/sh; 48" x 144"; 21.7 lb /sh *u 19.31 lb /sh *v fob plant *w 48" x 144" *x 100th *y 27 gauge *aa 16M lb & up *dd add $0.75 cwt boxing *ee 4 tons & up *ff 26 ga *gg add $2 cwt boxing; $0.75/cwt on skids *hh Theoretical wt for 48" × 96"; 60.4-lb, per sh. *ii 300-bag lots *jj 100-lb bag *mm Theoretical wt: 19.7-lb per sh. *nn 2% cash *oo Incl. Federal tax.



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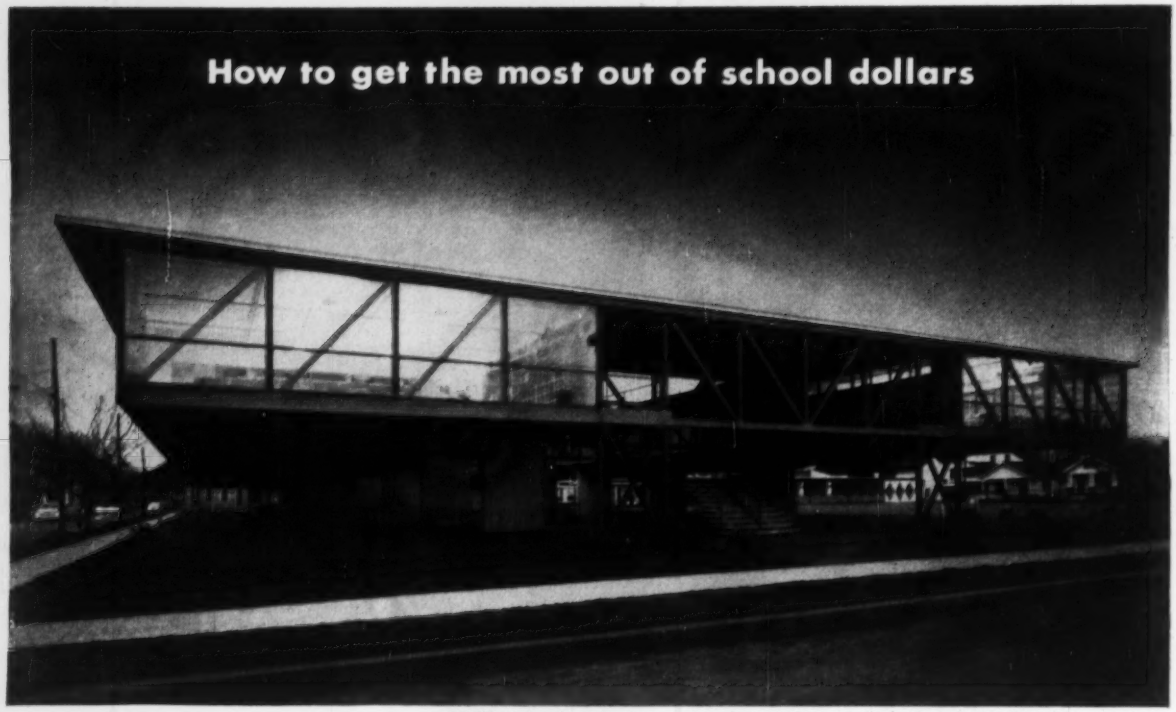

Phillis Wheatley Elementary School, New Orleans, Louisiana; B. M. Dornblatt & Assoc., Consulting Engineer; Charles R. Colbert, Architect; The Keller Construction Co., Contractor.

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J. H. WEBBER, M. R. ROESSLER, E. R. HUBER, Statistics.

NEW ENGLAND

BUILDINGS—BA

Mass., Cambridge—CHURCH, etc.—BA 9/30—Armenian Holy Trinity Church, Rev. Papken Maksondian, pastor, 145 Brattle St., church and social hall, Sparks and Brattle Sts. $600,000. John S. Bilzerian, 340 Main St., Worcester, archt. CD 3/20/56.

Conn., West Haven—SCHOOL—BA 10/2—Town, Bd. Educ., 270 Main St., 1 story, masonry Alma E. Pagels School Addn., Benham Hill Rd. $350,000. Plans deposit $50. Smith & Persse, 258 Church St., New Haven, archts. Hill & Harrigan, 909 Whalley Ave., New Haven, engrs. CD 7/1.

Mass., Randolph—SCHOOL—BA 10/11—Town, Elementary School Comm., c/o School Dpt., Randolph, elementary school, Vesey Rd. $700,000. Plans deposit $50. Korslund, LeNormand & Quann, Inc., 506 Washington St., Norwood, archts. CD 4/23, under LB.

BUILDINGS—SLC

Conn., Hartford—HOSPITAL—Hartford Hospital, 80 Seymour St., soon lets contract Hartford Hospital alterations. $345,000. Shepley, Bulfinch, Richardson & Abbott, 1 Court St., Boston, Mass., archts. CD 9/5.

HEAVY CONSTRUCTION—LB & CA

▲ White Oak Excavators, Inc., 61 E. Main St., Plainville, Conn., CA $1,687,636, grading west approach to Gastonbury-Wethersfield Bridge across Connecticut River at Wethersfield, HARTFORD, CONN. Greater Hartford Bridge Auth., 71 Capitol Ave., Hartford, Conn. Bids Aug. 9, awarded Aug. 10. CD 8/13, under LB.

BUILDINGS—LB & CA

▲ Vara Constr. Co., Inc., 718 Huntington Ave., Boston, Mass., CA $1,379,260, E607, AUDITORIUM, GYMNASIUM, CAFE and ADMIN. BLDG., State Teachers College, SALEM, MASS. Commonwealth of Mass., Dpt. Educ., c/o. Div. Bldg. Constr., 38 Chauncey St., Boston, Mass. Bids Aug. 6. CD 8/20.

▲ Francis S. Harvey & Son, Inc., 141 Dewey St., Worcester, Mass. CA $1,299,887, Mass. 19-CH-20DS DORMITORY and DINING HALL, Institute Rd., WORCESTER, MASS. Worcester Polytechnic Institute, Institute Rd., Worcester, Mass. Bids Sept. 5. CD 9/10, under LB.

MIDDLE ATLANTIC

BUILDINGS—BA

▲ Pa., Royersford—SCHOOL, etc.—BA 10/1—Spring-Ford School Auth., Royersford, high school, parking lot, greenhouses and swimming pool $2,588,006. S. W. Herring, engr. and H. F. Everett & Assocs., archts., both Commonwealth Bldg., Allentown, Pa. CD 6/12, under LB.

▲ Pa., Glenshaw—SCHOOL—BA 10/7—School Dist. of Shaler Twp., Glenshaw, brick, block, steel Junior High School. $1,500,000. Plans deposit $50. Trefry Eng. Co., Rte. 8, Butler, archts. CD 11/9.

▲ N. Y., Utica—AUDITORIUM, etc.—BA 11/22—City, City Hall, municipal auditorium and sports arena at Whitsboro and Oriskany Sts. $3,000,000. Extended date. Gehron & Seltzer, 101 Park Ave., New York, Zone 17, archts. CD 6/28, under LB.

BUILDINGS—SLC

Pa., Melrose Park—SERVICE CENTER—Budd Ross, archt., 5409 Market St., Phila., soon lets contract, Catering Service Center for The Sheldron, 1317 W. Lehigh Ave., Phila., Pa. $600,000. CD 6/18.

▲ Pa., Pittsburgh—HOSPITAL—St. Johns General Hospital, 3329 McClara Ave., soon lets contract, 5 story, brick, block steel frame hospital addn., alterations. $1,500,000. Neil & Hoover, 1206 Century Bldg., archts. CD 8/10/55.

HEAVY CONSTRUCTION—LB & CA

▲ Charles F. Vachris, Inc., 9024 Ditmas Ave., Brooklyn 36, N. Y., CA $2,584,850 (9 bidders) BP-140.004 dredging and placing fill for Pier No. 10, Brooklyn-Port Authority Piers, BROOKLYN, N. Y. The Port of New York Auth., 111 Eighth Ave., New York 11, N. Y. Bids Aug. 20. CD 7/23.

▲ Horn Constr. Co., Inc., 2174 Hewlett Ave., Merrick, N. Y. CA $1,983,775. combined project, Contr. BP-150.011 pile and deck constr. Contr. BP-150.013 bulkhead constr. for Pier 1, Brooklyn-Port Authority Piers, BROOKLYN, N. Y. The Port of New York Auth., 111 Eighth Ave., New York 11, N. Y. Bids Aug. 27. CD 8/29, under LB.

D. Fortunato, Inc., 11 Garfield Ave., Floral Park, N. Y., LB $409,000. (2 bidders) Div. VIII, general constr. for an addn'l. refuse pit, scale house, new crane trolley, new traveling screen reconstr., southwest corner of West Tipping Room, new access roads and other accessories, for existing refuse disposal plant addns. and replacements, HEMPSTEAD, N. Y. Town Bd., Town Hall, Hempstead, N. Y. Bids Sept. 10. CD 8/22.

NEW JERSEY—State Hy. Dpt., 1035 Parkway Ave., Trenton,
Arthur R. Henry, Inc., Northfield, N. J. LB $411,995. imprv. Route 48 and Route 40, Fed. Proj. No. F-89 (8). Bids Sept. 10. CD 8/23.
Gray & Fear, Woodbury Heights, N. J., CA $436,243, 3 pumping stations and sanitary sewers, GIBBSTOWN, N. J. Greenwich Twp. Comn., Gibbstown, N. J.

▲ PENNSYLVANIA—Commonwealth of Pennsylvania, Dpt. Hys., Harrisburg. Bids opened 9/13.
Pa.—Harrison Constr. Co., 1101 Western Ave., Pittsburgh, Pa. LB $910,857. (7 bidders), constr. 8,019 ft. of conc. pavt. variable in width; 2 bridges Legislative Rte. 802 (4), Allegheny Co., LB $2,776,612 (6 bidders), divided by rein.con., incl. 3 bridges, L. R. 797 (3), Sect. Erie Expressway, Girard Twp., Platea Boro, Erie Co.;
Pa.—E. M. Brown, Inc., Clearfield, Pa. LB $375,581. (4 bidders), bit. surf. variable in width incl. 2 bridges, L.R. 24013 (6), Benzinger Twp., Elk Co.;
Pa.—Brownstown Constr. Co., Box 27, Brownstown, Pa. LB $191,869. (12 bidders), flex. base, bit. surf., L. R. 06096 (2), Birdsboro Boro, Union Twp., Berks Co.;
Pa.—Dinardo, Inc., 331 Bouquet St., Pittsburgh, Pa. LB $97,788. (2 bidders), surf. 1,817 ft. existing road bit. surf. variable in width, T.R. 80, Pittsburgh, Allegheny Co.;
Pa.—Lawrence Sherbine, Box 66, Wilmore, PA. LB $109,962. (4 bidders), C. conc. base, bit. surf. incl. rein. con. T-beam bridge, L.R. 11030 (2), Nanty Glo Boro, Cambria Co.;
Pa.—Bracken Constr. Co., Sligo, Pa. LB $126,203. (4 bidders), flex. base, bit. surf. and 2 bridges, T.R. 428, Elk Twp., Clarion Co.;
Pa.—W. L. Dunn Constr. Co., Cochranton, Pa. LB $284,068. (8 bidders), bit. surf. L. R. 20141 and 1 bridge, L.R. 20141 (1R), W. Mead & Woodcock Twps., Saegertown Boro, Crawford Co. CD 8/26.

▲ J. E. Tillman, 702 N. Foqust St., Centralia, Ill., LB $1,633,815 (12 bidders) 25 m.g. low service reservoir in Brentwood Park vicinity, New York Ave. and 9th St. N.E., WASH., D. C. D. C. Govt., Dpt. Sanitary Eng., 499 Pa. Ave. N.W., Wash., 25, D. C. Bids Sept. 12. CD 8/2.

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $44,000; other public works $73,000; industrial buildings $93,000; other buildings $344,000. Also Foreign projects of $100,000 and more in size of interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England | **Middle West**
Middle Atlantic | **West of Mississippi**
South | **Far West**

PROPOSED WORK
Water Supply | **Public Buildings**
Sewers, Waste Disposal | **Mass Housing**
Bridges | **Commercial Buildings**
Streets & Roads | **Industrial Buildings**
Earthwork, Waterways | **Unclassified**

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.
SOON LETS CONTRACT: SLC

LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.

CD dates shown are of Construction Daily Issue in which last previous report was published.

OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

† Federal Government
▲ Project of $1,000,000 or over.
ENR Engineering News-Record
CD Construction Daily

For additional reports see Construction Daily.

▲ MARYLAND—State Rds. Comn., 108 E. Lexington St., Baltimore, Zone 2,
George & Lynch, Inc., Delaware Trust Bldg., Wilmington, Del., CA $1,065,864. Contr. WO-352-2-120 grading, drainage, surf. 3.188 mi. of dual and single lane highway, U. S. Route 50 near Berlin, Worcester Co. Bids Aug. 6. CD 8/13, under LB.

BUILDINGS—LB & CA

▲ John W. Rouse Constr. Corp., 8 Church St., Gouverneur, N. Y., CA general contract, ALUMINUM FOUNDRY, incl. 100x275 ft. office bldg., Roosevelt Toll Rd., 8 mi. east of MASSENA, N. Y. General Motors Corp., Chevrolet Div., W. Grand Blvd., Detroit, Mich. Smith-Hinchman & Grylls, Inc., 800 Marquette Bldg., Detroit, Mich., archt.-engrs. CD 2/25.
Taylor & Gaskin, Inc., 2210 Park St., Detroit, Mich., CA structural steel for foundry (Massena, N. Y.).

† George Rosen, Inc., 1650 Broadway, New York, N. Y., CA $657,000 Bids 1 and 21 alterations, Veterans Administration HOSPITAL, NEW YORK, N. Y. Veterans Admin., Munitions Bldg., Wash. 25, D. C. Bids July 30, awarded Sept. 10. CD 8/8, under LB.

▲ Edward Robbins, Inc., 147 Fourth Ave., New York 3, N. Y. LB $2,402,360 (12 bidders) three ELEMENTARY SCHOOLS, YORKTOWN, N. Y. Central School Dist. No. 1, Towns of Yorktown, Somers and Cortlandt, Westchester County and Putnam Valley, Carmel and Phillipstown, Putnam, Bd. Educ., Lakeland Highland High School, U. S. Route 6, Mohegan Lake (near Peekskill), N. Y. Bids Aug. 29. CD 7/18.

Gene Genola, operating as Genola Builders, Inc., 149 Webb Ave., Asbury, N. J. Own Forces. $500,000. 90 unit MOTEL and COFFEE SHOP, 8th Ave. and Deal Lake Dr., ASBURY PARK, N. J.

▲ Homespot Village, att. Mr. A. Carracciola, Blue Anchor, N. J. Separate Contracts. $1,000,000, 75 RESIDENTIAL DEVELOPMENT, Blue Anchor Rd., HAMMONTON, N. J. William Dean Faint, 1915 Browning Rd., Pennsauken, N. J., archt.

Belli Co., 2127 Hamilton Ave., Trenton, N. J., LB $686,700, ADMINISTRATION SERVICE BLDG., PRINCETON, N. J. Princeton University, Princeton, N. J. Gibbs & Hill, 461 8 Ave., New York, N. Y., engrs. CD 3/27.

▲ Mahony-Troast Constr. Co., 790 Bloomfield Ave., Clifton, N. J., CA Est. $1,000,000, 1 story warehouse and 2 story office, 72,000 sq. ft., aluminum steel and marble, at Garden State Parkway and Route 1, WOODBRIDGE, N. J. Ronson Corp., 31 Fulton St., Newark, N. J. Edward T. Browser, Jr., 41 Oak St., East Orange, N. J., archt. George Aulbach, Nooman Eng. Co., York, Pa., engr.

▲ Facciolo & Barrett, 779 Lancaster Ave., Villanova, Pa., Separate Contracts, $1,000,000. RESIDENTIAL DEVELOPMENT, Rosery Woods Development, BROOMALL, PA.

Fort Washington Industrial Park Constr. Co., Fort Washington, Pa., CA $500,000. MFT. PLANT and OFFICE BLDG., FORT WASHINGTON, PA. Columbia Steel Equipment Co., Fort Washington, Pa. Thomas J. Mangan, Fort Washington, Pa., archt.

Joseph E. Heffernan, Rowland Ave. and Guilford St., Phila., PA. LB $454,000, Alta S. Learcy Elementary SCHOOL—alterations, JOHNSVILLE, PA. Warminster Twp. School Auth., Johnsville, Pa. Bids Aug. 27. CD 8/8.

Arters Bros., Inc., Lima, Pa., Separate Contracts, $425,000, 17-unit RESIDENTIAL DEVELOPMENT, Providence Rd., etc., MEDIA, PA.

L. F. Driscoll, 32 W. Coulter St., Phila., Pa., LB $794,000. HIGH SCHOOL addns. and site work, NEWTOWN, PA. Council Rock Joint School Auth., Newtown, Pa. Bids Aug. 27. CD 8/23.

James Meloney & Son, 302 E. Essex Ave., Lansdowne, Pa., Separate Contracts, $560,000. RESIDENTIAL DEVELOPMENT, Oxford Ave., etc., PHOENIXVILLE, PA.

▲ Blake Constr. Co., Inc., 33 "E" St. S.W., Wash., D. C., CA $2,448,000, new diagnostic bldg., Georgetown MEDICAL CENTER, WASH., D. C. Georgetown University, 38 and "O" Sts. N.W., Wash., D. C. Bids Aug. 7, awarded Sept. 13. CD 8/9, under LB.

SOUTH

BUILDINGS—BA

Miss., Pass Christian—HOUSING—BA 10/3—Mississippi Regional Housing Auth. No. VII of Gulfport, City Hall, Gulfport, low-rent housing Project No. Miss 40-5A, incl. 7 dwelling bldgs.; incl. 14 units and management-maintenance bldg., incl. lawns, planting, utilities, and low-rent housing Project Miss 40-5B, incl. 7 dwelling buildings with 14 units and maintenance bldg., incl. lawns, planting, utilities. Plans deposit $100. William L. Rosamond, Propst Bldg., Columbus, archt.

BUILDINGS—SLC

▲ La., St. Francisville—PLANT—St. Francisville Paper Co., (jointly owned by Crown Zellerbach Corp. and Time, Inc.), St. Francisville, soon lets contract plant etc. for pulp and paper mill on site about 6 mi. west of DeRidder. $31,000,000. CD 1/7.

HEAVY CONSTRUCTION—LB & CA

▲† McWilliams Dredging Co., 903 S. Jefferson Dr., Pkway, New Orleans, La. LB $2,015,040. Old River Control outflow channel, incl. dredging, Proj. No.

58-8, in Concordia Parish, LOUISIANA. U. S. Eng., foot of Prytania St., New Orleans, La. Bids Sept. 11. CD 8/16.

† **McAlister-Davis Co.**, 1439 S. Bellevue Blvd., Memphis, Tenn. LB $560,000, est. $543,800. constr. revetment on Mississippi River between Richardson Landing and Ashport, Tenn., grading 1 mi. cu. yd. bank and placing 60,000 squares articulated concrete mattress, Memphis, Shelby Co., TENNESSEE. U. S. Eng., P.O. Box 97, Memphis, Tenn. Bids Sept. 5. CD 8/22.

BUILDINGS—LB & CA

▲ **Irving D. Berger & S. J. Kass**, 4479 Connecticut Ave. N. W., Wash., D. C., Owner Builds. $1,500,000 2 story OFFICE BLDG. and STORES, adjacent to Seven Corners Shopping Center, FAIRFAX, VA.

▲ **Daniel Constr. Co.**, Box 2286, Greenville, S. C., CA $1,449,000. PHYSICS BLDG., ATHENS, GA. University System Bldg. Auth., 244 Washington St. S. W., Atlanta, Ga. Bids Sept. 4, awarded Sept. 9. CD 9/12, under LB.

S. P. Henderson & Son, Pell City, Ala. LB $457,940. low rent HOUSING, Ala. 106-1A and 106-1B, PELL CITY, ALA. Pell City Housing Auth., Courthouse, Pell City, Ala. Bids Sept. 5. CD 8/7.

MIDDLE WEST

BUILDINGS—BA

Mich., **Ann Arbor**—APARTMENTS—BA 10/8—Bd. Regents University of Michigan, Plant Service Bldg., N. University and Forest Aves., Group III, Proj. No. 96, Northwood Apartments. Plans deposit $50. Leinweber & Assoc., 103 W. 5 St., Royal Oak, archts. Yamasaki, Leinweber & Assoc., 103 W. 5 St., Royal Oak, archts. Proj. No. 116, Northwood Apartments, Group III site imprvs., incl. 6,000 ft. storm and sanitary sewers, 2,700 ft. 6- to 12-in. water mains, electrical work, 89 poles luminaires street lighting, 13,000 sq. yd. bit. road surf. Plans deposit $15. McNamee, Porter & Seeley, 2223 Packard Rd., engrs. CD 11/2/55.

▲ **O., Columbus**—FINE AND APPLIED ARTS SCHOOL—BA 10/8—Ohio Dpt. P. Wks., 705 Ohio Dpts. Bldg., Columbus. School of Fine and Applied arts for college of education, Ohio State University, $1,000,000. Plans deposit $25. Crumley-Musson, 965 E. Broad St., Zone 5, archts. CD 7/19.

HEAVY CONSTRUCTION—LB & CA

▲ **MICHIGAN**—State Hy. Comn., John C. Mackie, hy. comr., Stevens T. Mason Bldg., Lansing,

Mich.—**Bacco Constr. Co.**, Iron Mountain, Mich., CA $704,747, est. $730,000, grading, drainage structures, paving parts US-41 and M-28, 7.963 mi., also bridge over Carp River, F 52041 C2-U (F 137 17) F 52042 C3-U (F 108 6) F 52042 C4-R (F 108 6) etc., Marquette Co.;

Mich.—**Alpine Constr. Co., Straits Constr. Co.**, St. Ignace, and **Pierson Contg. Co.**, 200 Eddy Bldg., Saginaw, Mich., CA $603,486, est. $540,000, grading, drainage structures, base course, wid'n. 3.183 mi. US-2, St. Ignace, F 49024 C2-Un (F 143 13) F 49024 C3-RN (F 143 13), Mackinac Co. Bids Aug. 21. CD 9/6, under LB.

BUILDINGS—LB & CA

Paugh & Brown, 6007 Euclid Ave., Cleveland 3, O., LB $380,069 (6 bidders) general contract rehabilitation work at old Marine HOSPITAL, CLEVELAND, O. Ohio Dpt. P. Wks., State Dpts. Bldg., Columbus, O. Bids Sept. 25. CD 8/21.

Hamel-Vance Constr. Co., 261 Oakland Dr., Lansing, Mich., CA $413,578. HIGH SCHOOL, HASLETT, MICH. Bd. Educ., Haslett Public Schools, Haslett, Mich. Bids Aug. 29. CD 8/9.

▲ **Jeffrees-Dyer, Inc.**, 545 South Main St., Ann Arbor, Mich., LB $1,154,575, SCHOOL OF PUBLIC HEALTH addn., University of Michigan, ANN ARBOR, MICH. Bd. Regents University of Michigan, W. K. Pierpont, vice pres., Ann Arbor, Mich. Lewis J. Savis, 258 Champion St., Battle Creek, archt. Bids Aug. 29. CD 12/4.

▲ **Rossin & Assocs.**, 18685 Wyoming St., Detroit, Mich. Owner Builds. $1,670,000, 100 brick 3 bedroom ranch HOMES, Charles and Buffalo, south of 6 Mile Rd., DETROIT, MICH.

▲ **Anchor Realty Co.**, 15030 Wyoming St., Detroit, Mich. Owner Builds. $3,500,000, 220 brick HOMES, Algonquin Park subdivision, Middlebelt and Schoolcraft, LIVONIA, MICH.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—LB & CA

Alley Constr. Co., Faribault, Minn. LB $592,957. (7 bidders) site preparation of new terminal area Wold-Chamberlain Field, MINNEAPOLIS, MINN. Minneapolis-St. Paul Metropolitan Airports Comn., 2429 University Ave., St. Paul, Minn. Bids Sept. 6. CD 8/30.

Ashbach Constr. Co., 1910 West County Road C, St. Paul, Minn. LB $375,878. Sects. I, II, and III sanitary sewers and water mains, Wold-Chamberlain Field, MINNEAPOLIS, MINN. Minneapolis-St. Paul Metropolitan Airports Comn., R. Aldrich, exec. dir., 2429 University Ave., St. Paul, Minn. Bids Sept. 6. CD 8/30.

J. S. De Gido, 5436 Fourty-Fifth Ave. South, Minneapolis, Minn. and **Stein Plumbing & Heating Co.**, Shakopee, Minn. LB $75,183 (6 bidders) Section B (Minneapolis, Minn.)

Wolff Constr. Co., 2360 University Ave., St. Paul, Minn. LB $205,064. (5 bidders) Section IV (Minneapolis, Minn.).

▲† **Al Johnson Constr. Co.**, Foshay Tower, Minneapolis, Minn. CA $3,132,762. substructure of C.M. St. Paul & Pacific R.R. Co., Missouri River Bridge, Oahe Reservoir Project, near Mobridge, Inv. 25-0665-8-3, SOUTH DAKOTA. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Sept. 4. CD 9/10, under LB.

S. Patti Constr. Co., 1340 Admiral St., Kansas City, Mo. LB $500,140. sewage plant, OLATHE, KAN. Indian Creek Sewer Sub-sewer Dist. 1, Johnson Co., Olathe, Kan. Bids Aug. 26.

▲ **COLORADO**—State Hy. Dpt., 4201 E. Arkansas St., Denver.

San Ore Constr. Co., McPherson, Kan., CA $1,253,901, est. $1,528,000. stabilization and asph. surf. 21.635 mi. Colo. Proj. I 092-2 (2), Fountain, Pueblo and El Paso Counties. Bids Sept. 10, awarded Sept. 11.

▲† **J. W. Batson, Inc.**, Gibraltar Life Bldg., Dallas, Tex., LB $2,480,540 base exchange complex, Air Force Academy, No. 05-613-58-1, COLORADO SPRINGS, COLO. Dpt. Air Force, Box 1680, Colorado Springs, Colo. Bids Sept. 10. CD 8/21.

BUILDINGS—LB & CA

▲ **Cadron Valley Development Co., Inc.**, Lee Shock, secy-treas., Conway, Ark. Owner Builds. $5,000,000 SUBDIVISION HOUSING DEVELOPMENT, incl. 500 residences streets, sewers, etc., on 80 acre site, northwest of city limits, CONWAY, ARK.

Harold G. Weil, Developer, Builder, 100 Glass St., Dallas, Tex., Owner Builds. $349,500. 30 DWELLINGS; $377,150, 35 DWELLINGS in "Kenilworth Estates", DALLAS, TEX. CD 8/16.

▲ **Laughlin & Silver**, 1502 Centerville Rd., Dallas, Tex. Owner Builds. $366,000, 22 DWELLINGS, $347,500, 18 DWELLINGS, $364,500, 26 DWELLINGS in "Valwood Park", FARMERS BRANCH, TEX. Grand total $1,078,000. CD 8/29.

▲ **St. Joseph's Hospital**, c/o Sisters of Charity of the Incarnate Ward, 1400 S. Main St., Fort Worth, Tex., rejected bids Sept. 5, HOSPITAL addn. FORT WORTH, TEX. LB Est. $3,883,000. CD 9/9, under LB.

Hubbard Constr. Co. Inc., Box 1652, Houston, Tex., LB $744,530 Base Bid, BOTTLE SHOP, PACKAGING CENTER, GALVESTON, TEX. Falstaff Brewing Corp., 3312 Church St., Galveston, Tex. Bids Aug. 26. CD 8/6.

▲ **Sebastian Corp.**, 414 Detering St., Houston, Tex., CA $1,926,000 PARKING GARAGE, HOUSTON, TEX. Hermann Estate, 6410 Fannin St., Houston, Tex. Bids Aug. 14. CD 8/29, under LB.

McClendon Constr. Co., Box 1403 Longview, Tex., CA $553,723 (base contr.) BANK-OFFICE, LONGVIEW, TEX. Longview National Bank, Longview, Tex. Bids Aug. 29. CD 9/11, under LB.

▲ **Procon, Inc.**, c/o Owner, Port Arthur, Tex., CA Est. $3,250,000. GASOLINE PLANT for processing light gasoline, PORT ARTHUR, TEX. Gulf Oil Corp., 7th St. Rd., Port Arthur, Tex. CD 5/18/56.

▲ **Southwestern Constr. Co.**, 4949 Rusk St., Houston, Tex., CA $1,000,000 4 story MELT HOUSE, SUGARLAND, TEX. The Imperial Sugar Co., Sugarland, Tex. CD 10/17/55.

FAR WEST

BUILDINGS—BA

Calif., Chico—SOCIAL SCIENCE CLASSROOM—BA 10/8—State Div. Architecture, 1120 N St., Sacramento, 3 story, concrete frame, 42,800 sq. ft. floor space, social science classroom at Chico State College, W.O. 3719-GC, 53. $800,000. CD 4/24/56.

▲ **Calif., Concord**—SCHOOL—BA 10/8—Mount Diablo Unified School Dist., c/o Supt., Concord, wood frame except shop and gym., rein.-con. Clayton alley High School. $2,569,669. Plans deposit $100. Confer & Willis, 366-40th St., Oakland, archts. CD 6/7.

Calif., Blythe—SCHOOL—BA 10/11—Palos Verde Unified School Dist., N. Hobsonway, Blythe, 34,000 sq. ft. frame, stucco Hobsonway Elementary School and 1,716 sq. ft. Enterprise addn., 4,092 sq. Ripley School addn. $831,800. Plans deposit $25. Harold Gimeno, 1400 N. Sycamore St., Santa Ana, archt. CD 7/17.

HEAVY CONSTRUCTION—LB & CA

▲† **W. W. Clyde & Co.**, Springville, Utah, CA $1,331,470 access streets and utilities for Page, Ariz., Colorado River Storage Proj. in Navajo Indian Reservation, DC 4896, ARIZONA-UTAH. Bureau Reclamation, Dpt. Interior, Kanab, Utah. Bids May 28. CD 5/31, under LB.

▲† **Southern Eng. & Constr. Co.**, 2650 Cherry St., Long Beach, Calif., CA $1,054,694, est. $869,547, water supply sys. for Page, Ariz., Spec. DC 4933, 15 mi. upstream from Lees Ferry, Ariz., Glen Canyon Unit, Arizona-Utah. Middle River Division, Colorado River Storage Proj., ARIZONA, UTAH. Bureau Reclamation, Dpt. Interior, Kanab, Utah. Bids Aug. 13. CD 8/22.

▲ **WASHINGTON**—State Hy. Comn., E. A. Cowell, chn. Dpt. Hys., Olympia, Bids opened 9/10,

Wash.—**Russell-Gillett Co.**, Cle Elum, Wash. LB $94,171, (5 bidders), four rein.-con. slab bridges over Foster Creek and at Palisades together with grading, surf. 0.296 mi. approaches, FAS No. ER-23 (6) and S-1022 (2), Douglas Co.; LB $183,815 (6 bidders), two precast, prestressed concrete undercrossings on Primary State Hy. 2 for Stampede Rd. and Cabin Creek Rd., FAP No. I-002-2 (11), Kittitas Co.;

Wash.—**Cherf Bros. & Sandkay, Inc.**, Ephrata, Wash. LB $166,566 (3 bidders), two precast, prestressed concrete undercrossings on Primary State Hy. 18 at Morrison Rd. and May Valley, FAP No. I-002-4 (8), Grant Co.;

Wash.—**L. Elterich Co.**, Port Angeles, Wash. LB $470,536 (6 bidders), steel girder bridge with rein.-con. approaches over north fork of Skagit River 0.137 mi. County Rd., FAS No. S-0315 (1), Skagit Co.;

Wash.—**C. B. Croy**, Bellingham, Wash. LB $123,107 (8 bidders), rein.-con. slab bridge for Kentucky St. and C. M. St. P & P RR overcrossing 0.025 mi. Primary State Hy. 1 in Bellingham, FAP No. I-001-5 (19), Whatcom Co.;

Wash.—**Woodworth, & Co., Inc.**, 1200 E. 0 St., Tacoma, Wash. LB $183,915 (8 bidders), rein.-con. box girder undercrossing for Union Ave. on Primary State Hy. 1, FAP No. I-001-2 (28), Unit 1, Pierce Co. CD 8/29.

▲† **Cheney-Cherf-Sandkay-Green-Birch**, Central Bldg., Seattle, Wash. LB $2,894,205, est. $2,412,867 Schedules 1 and 4, (7 bidders) Sch. 1, constr. Keene Creek Dam and Green Springs power conduit and Sch. 4, concrete cylinder pipe (pretensioned reinforced) or welded plate steel pipe, Rogue River Proj., Spec. DC 4948, OREGON. Bureau Reclamation, Dpt. Interior, Camp White, Ore. Bids Sept. 10. CD 8/5.

▲† **M. H. Hasler Constr. Co. & F. W. Case Corp.**, 458 S. Spring St., Los Angeles, Calif., CA $1,531,599 Sch. 2, constr. Robles Diversion Dam and Robles Casitas Diversion Canal utilizing per test concrete pipe in 78 in. diam. sizes, Ventura Proj. Spec. DC 4937, CALIFORNIA. Bureau Reclamation, Dpt. Interior, Oak View, Calif. Bids Aug. 15. CD 8/19, under LB.

BUILDINGS—LB & CA

▲† **Page City Constr. Co.**, Bakersfield, Calif., LB $2,723,500, 200 HOMES for Page Ariz., near Lees Ferry, Colorado River Storage Proj., Spec. No. 4945, ARIZONA. Bureau Reclamation, Dpt. Interior, P. O. Box 267, Kanab, Utah. Bids Sept. 12, CD 9/5.

Cawdrey & Vemo, 3601 Fremont Ave., Seattle 3, Wash., CA Total est. $720,000, general contract. 4 story, rein-con. addn. to HOSPITAL, SEATTLE, WASH. Seattle General Hospital, 5 Ave. and Marion St., Seattle, Wash. Bids July 30, CD 7/26;

University P. & H. Co., 3941 University Way, Seattle 5, Wash., CA mechanical contract (Seattle, Wash.);

D. W. Close Co., 2921 13 Ave. S. W., Seattle, Wash., CA electrical contract (Seattle, Wash.);

Westinghouse Elec. Corp., White-Henry-Stuart Bldg., Seattle 1, Wash., CA elevators (Seattle, Wash.).

▲ **William C. Crowell, Inc.**, 170 E. California St., Pasadena, Calif., CA $1,769,900 Glendora HIGH SCHOOL Glendora, AZUSA, CALIF. Citrus Union High School Dist., 18824 E. Foothill Blvd., Azusa, Calif. Bids Aug. 6. CD 8/19, under LB.

▲ **Continental Constr. Co.**, P. O. Box 2551, Sacramento, Calif., CA $1,505,000 Encina HIGH SCHOOL, 1400 Bell Ave., CARMICHAEL, CALIF. San Juan Union High School Dist., 3738 Walnut Ave., Carmichael, Calif. Bids Sept. 10. CD 9/13, under LB.

▲ **Claremont Constr. Co.**, 1503 Condor Ave., El Cajon, Calif., Owner Builds. $1,173,000, 102 stucco DWELLINGS Madison, Onyx and Jode Aves., EL CAJON, CALIF.

▲ **Alondra Investment Co.**, 15630 Crenshaw Blvd., Gardena, Calif., Owner Builds. $1,228,640, 1137-1162 sq. ft., 104 stucco DWELLINGS, La Habra Tr. 3200, LA HABRA, CALIF.

Western Empire Constr. Co., P. O. Box 516, Concord, Calif., LB $530,500 (12 bidders) 1 story, 34,000 sq. ft., wood frame Marilyn Ave. Elementary SCHOOL LIVERMORE, CALIF. Livermore Elementary School Dist., c/o Supt., P. O. Box 472, Livermore, Calif. Bids Sept. 5. CD 8/21.

CANADA

HEAVY CONSTRUCTION—LB & CA

NOVA SCOTIA—Dpt. P. Wks., Dpt. Hys., Halifax,

Martells Constr. Ltd., Peppett St., N., Sydney, N. S., CA $800,000 access road at Kelly Lake International Airport, about 21 mi. from Halifax, road about 10 mi. Bids Sept. 3.

ONTARIO—Dpt. Hys., Parliament Bldgs., Toronto,

H. J. McFarland Constr. Co., Ltd., Talbot St., Picton, Ont., CA $514,135 Contr. 57-29, gran. base, hot mix paving, 5.72 mi. from road allowance between lots 18 and 19 Sydney Twp. easterly to Moria River. Bids Aug. 28, awarded Sept. 6. CD 9/5, under LB.

Coles-Jeffrey Constr. Co., Ltd., 560 Exmouth St., Box 450, Sarnia, Ont., CA $712,500 railway bridge proj. incl. driving and filling with concrete of steel monotube piles, constr. rein.-con. footings, abutments, wingwalls, piers, etc., SARNIA, ONT. Canadian National Railways, E. Griffiths, ch. engr., Union Station, Toronto, Ont. Bids June 14, awarded Sept. 16. CD 8/26, under LB.

Omega Constr. Co., Ltd., 6555 Cote De Neiges Rd., Montreal, Que., CA $810,712 greenhouses and related work at forestry Div., Maisonneuve Park, 5665 Blvd. Pie IX, MONTREAL, QUE. City, City Hall, Montreal, Que. Bids Sept. 4. CD 8/29, under LB.

BUILDINGS—LB & CA

Hamill Constr., Box 251, Galt, Ont., LB $420,700 (12 bidders) 2 story, 18,000 sq. ft. concrete, steel, brick REGISTRY OFFICE, concrete fdn., BRAMPTON, ONT. Peel Co., Henry Rutherford, clerk-Treas., Brampton, Ont. Rounthwaite & Fairfield, 93 Yorkville Ave., To-

(Continued on page 86)

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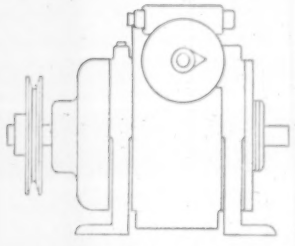
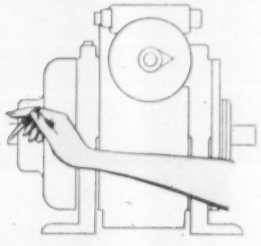
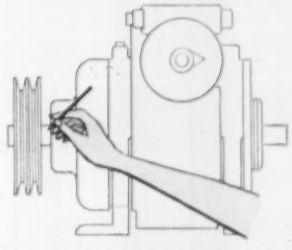


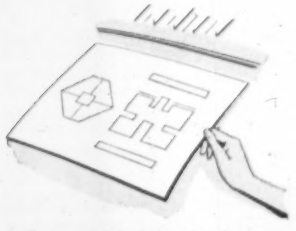
1. This is an Ozalid intermediate (translucent) print of the original drawing.



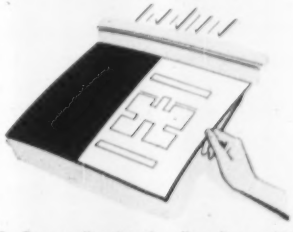
2. Draftsman eradicates obsolete lines with Ozalid Corrector Fluid.



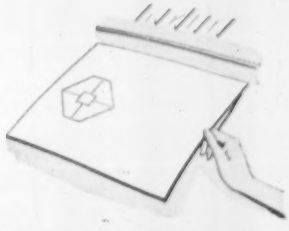
3. New design is drawn in. Prints can now be run from this intermediate "master."



1. Expose original drawing in the usual manner on Ozalid intermediate paper, cloth, or foil. But do not develop!



2. Cover all printed yellow lines which are to be retained on the intermediate with a mask of black opaque paper—re-expose in Ozalid machine. The light will remove all obsolete details left uncovered.



3. Develop the intermediate . . . and you have a clear, up-to-date "framework" to which you add the new design. Use this intermediate master to produce prints.

OZALID®

Products for Design

A Division of General Aniline & Film Corporation
In Canada: Hughes Owens Company, Ltd., Montreal

(Continued from page 84)

ronto, Ont., archts. Wallace, Carruthers & Assocs., Ltd., 92 Yorkville Ave., Toronto, Ont., engrs.

▲ **Northview Constr. Co., Ltd.**, 35 Crockford Blvd., Toronto, Ont., CA Est. $5,000,000 HOUSING in East Gwillimbury Heights, NEWMARKET, ONT. Sep-tone Developments Ltd., 35 Crockford Blvd., Toronto, Ont. Design Inc., 2454 Kingston Rd., Toronto, Ont., archts.

▲ **Perini Ltd.**, 49 Jackes Ave., Toronto, Ont., CA Total est. $7,000,000. substructure, 16 story, 6 bsmnts. OFFICE South Side Richmond St. W., TORONTO, ONT. Sun Life Assurance Co. of Canada, Victoria and Adelaide Sts., Toronto, Ont. Bids Aug. 14. CD 8/9.

Duroc Constr. Inc., 5126 Park Ave., Montreal, Que., CA $623,500 SCHOOL and GYMNASIUM, Mousseau St., St. Claire Parish, MONTREAL, QUE. Commission Scholaire Catholique de Montreal, 3737 Sherbrooke St., Montreal, Que. Bids Sept. 3. CD 8/29, under LB.

LATIN AMERICA

BUILDINGS—LB & CA

▲ **Ing. Cuahtemoc Cardenas**, Domicilio conocido, Mexicali, Baja, California, CA $1,600,000. state penitentiary, MEXICALI, MEXICO. State Govt., Palacio del Estado, Mexicali, Mexico. CD 6/25/52.

AMERICANS ABROAD

HEAVY CONSTRUCTION—LB & CA

Entrecanales & Tavora, Madrid, Spain, LB $524,394. (4 bidders) PAB-13, diesel power plant and electrical distribution Spanish Airbase Program, Spanish-American Contract, SAN PABLO, SPAIN. Bureau Yards & Docks, Dpt. Navy, 18 and Constitution Ave. N. W., Wash., D. C., U. S. A. Bids July 31.

PROPOSED PROJECTS

WATER SUPPLY

▲ **O., Toledo**—Comrs. Lucas Co., Court House, county water system to serve Washington, Adams, Sylvania and Springfield Twps. with intake in Lake Erie near Erie Rd., 72 in. gravity-flow conduit, water treatment plant near Suder Ave., 10 m. g. reservoir, water mains, 1 m. g. elevated water tank near Jerusalem Ave. and Coy Rds., etc., $13,231,000; water system to serve Oregon and Jerusalem Twps., $4,608,000. Finkbeiner, Pettis & Strout, 518 Jefferson St., consult. engrs. Raymond E. Hall, Jackman Rd., co. sanitary engr.

SEWERS, WASTE DISPOSAL

▲ **Mich., Kalamazoo**—City, Marie Pilarski, clk., City Hall, $4,321,410 bond election Nov. 5, storm and sanitary sewers. CD 7/18.

▲ **N. H., Dover**—City, Thomas H. Keenan, mayor, City Hall, sewerage sys. enlargement, pumping station and intercepting sewers. $1,590,500.

▲ **O., Euclid**—City of Euclid, City Hall, 585 E. 222 St., Cleveland, Zone 23, storm sewer extending length of Lake Shore Blvd. 84-in. at Euclid Park and tapering to 60 in. at either end of city. $2,500,000. Havens & Emerson, 640 Leader Bldg., Cleveland, Zone 14, consult. engrs. CD 11/9.

▲ **O., Euclid**—City of Euclid, City Hall, 585 E. 222 St., Cleveland, Zone 23, vote on 2-million levy at Nov. 5 election, sewer imprvs. in city. $2,000,000. CD 11/9.

BRIDGES

▲ **N. Y., New York**—President Manhattan Boro, Municipal Bldg., New York, Zone 7, Proj. PM-7, reconstr. and rehabilitation of Riverside Dr. Viaduct, St. Clair's Pl. to 135 St. $1,057,000. R. F. Schaefer, 76 Ninth Ave., Zone 11, consult. engr. CD 5/27.

▲ **SOUTH CAROLINA**—State Hy. Dpt., Columbia, Charleston Co.—Ashley River Bridge. $2,000,000. Barstow Eng., 112 West 42nd St., New York 36, N. Y., consult. engr. CD 8/25/49.

▲ **TEXAS**—State Hy. Dpt., State Hy. Bldg., Austin, Bexar Co.—overpass at Buena Vista and West Commerce Sts., San Antonio. $1,364,000.

STREETS AND ROADS

▲ **Que., Quebec City**—City, City Hall, Quebec City, Canadian National Rys., A. V. Johnston, ch. engr., Montreal, Que. and National Harbor Bd., Parliament Bldgs., Ottawa, Ont., new boulevard on Champlain St. from Levis Ferry to Sillery, incl. removing rail tracks, road bed, water mains, paving, sidewalks, curbs, sewers, etc. $1,483,000.

EARTHWORK, WATERWAYS

▲† **California**—U. S. Eng., 751 S. Figueroa St., Los Angeles, lower San Joaquin River and Tributaries for flood control. $1,000,000. appropriated. CD 8/1/46.

▲ **California**—U. S. Eng., 751 S. Figueroa St., Los Angeles, Devil, East Twin, Warm and Lytel Creeks, Flood control. $1,150,000 appropriated. CD 4/21/44.

▲† **California**—U. S. Eng., 751 S. Figueroa St., Los Angeles, flood control work at Riverside, Santa Ana River. $1,230,000 appropriated. CD 4/21/44.

▲† **California**—U. S. Eng., 751 S. Figueroa St., Los Angeles, San Diego Harbor and Mission Bay. $3,400,000 appropriated.

▲† **California**—U. S. Eng., 751 S. Figueroa St., Los Angeles, San Antonio and Chin Creeks flood control. $3,400,000 appropriated.

▲† **California**—U. S. Eng., 751 S. Figueroa St., Los Angeles, Los Angeles County Drainage area. $18,100,000 appropriated.

▲† **California**—U. S. Eng., 1209 8th St. Sacramento, Terminus Reservoir, Kaweah River. $2,500,000 appropriated. CD 4/21/44.

▲† **California**—U. S. Eng., 1209 8th St. Sacramento, Sacramento River flood control. $3,000,000 appropriated. major and minor tributaries $700,000 appropriated. CD 4/21/44.

▲† **California**—U. S. Eng., 1209 8th St. Sacramento, Success Reservoir, Tule River. $5,000,000 appropriated. CD 4/21/44.

▲† **California**—U. S. Eng., 1209 8th St. Sacramento, deep water ship channel in Sacramento River. $2,815,000 appropriated. CD 4/21/44.

▲† **California**—U. S. Eng., 1209 8th St. Sacramento, American River Levees $1,900,000 appropriated.

▲† **California**—U. S. Eng., 180 New Montgomery St., San Francisco, flood control San Lorenzo Creek $1,000,000 appropriated; flood control San Lorenzo River. $1,200,000 appropriated.

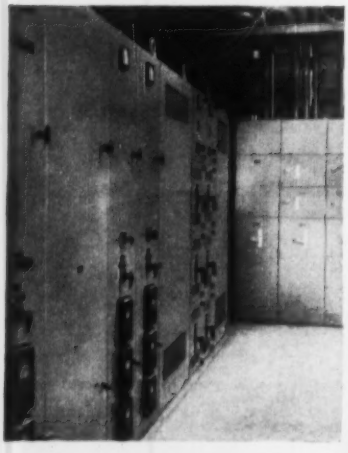
▲† **California**—U. S. Eng., 180 New Montgomery St., San Francisco, Russian River Reservoir. $5,000,000 appropriated.

▲† **Colorado**—Bureau Reclamation, Dpt. Interior, Denver Federal Center, Denver, constr. Vega Dam, the access road to Cottonwood No. 1 Reservoir, the Southside Canal, Collbran Project. $2,250,000 appropriated.

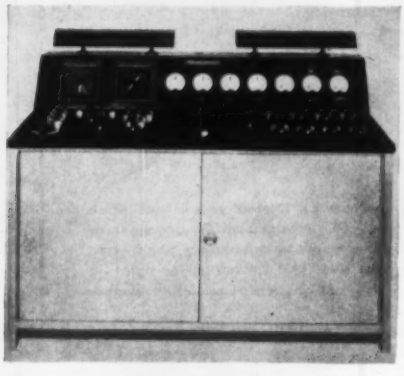
▲† **Connecticut**—U. S. Eng., 150 Causeway St., Boston, Mass., Thomaston Reservoir. $2,900,000 appropriated. CD 131.

▲† **Illinois**—U. S. Eng., 220 W. North Bank Dr., Chicago, Ill., Calumet-Sag Channel, Illinois Waterway Pt. 1. $6,000,000 appropriated. CD 5/17/43.

▲ **Ill., Chicago and Evanston**—Metropolitan Sanitary Dist. of Greater Chicago, 100 E. Erie St., flood control work, dredging North Shore Channel from Foster Ave. to Green Bay Rd., Evanston; clearing Des Plaines River of brush and debris, $1,800,000.

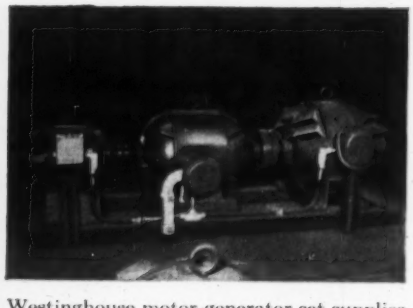


Westinghouse air-cooled power center transforms high voltage utility supply and distributes power for all bridge services. Compact and centralized control center shown at rear assures better motor control and greater savings.



Nerve center of action for the busy span. This Westinghouse control desk centralizes operation and indicates performance of bridge drives.

WESTINGHOUSE LIFTS IT



Westinghouse motor-generator set supplies power for regulated D.C.A.V. drive system.

South Park Avenue lift bridge . . . Buffalo, N. Y.

▲ **Iowa**—U. S. Eng., Clock Tower Bldg., Rock Island, Ill., flood control in Little Sioux River. $2,000,000.

▲† **Kansas**—U. S. Eng., 911 Walnut St., Kansas City 6, Mo., flood control at Topeka, Kansas River, $1,500,000 appropriated.

▲† **Kentucky, Indiana and Ohio**—U. S. Eng., 830 W. Broadway, Louisville, Ky., Markland Locks and Dam. $9,500,000 appropriated. CD 12/27/55.

▲† **Kentucky and Tennessee**—U. S. Eng., 306 Federal Office Bldg., Nashville, Tenn., Barkley Dam (Lower Cumberland Lock and Dam). $5,000,000 appropriated.

▲† **Kentucky**—U. S. Eng., 830 W. Broadway, Louisville, Rough River Reservoir and channels. $3,000,000 appropriated.

▲† **Kentucky**—U. S. Eng., 830 W. Broadway, Louisville, flood control, Catlettsburg. $2,000,000 appropriated.

▲† **Louisiana**—U. S. Eng., foot of Prytania St., New Orleans, Zone 9, imprv. Gulf Intracoastal Waterway, Plaquemine-Morgan City Alternate route, $3,500,000 appropriated.

▲† **Louisiana**—U. S. Eng., foot of Prytania St., New Orleans, Zone 9, flood control, Amite River and tributaries, $1,000,000 appropriated.

▲† **Massachusetts**—U. S. Eng., 150 Causeway St., Boston, Zone 14, flood control, Worcester. $1,500,000 appropriated.

▲† **Massachusetts**—U. S. Eng., 150 Causeway St., Boston, Zone 14, Boston Harbor, extension to 40 ft. anchorage. $1,000,000 appropriated.

▲† **Massachusetts**—U. S. Eng., 150 Causeway St., Boston, Zone 14, flood control, North Adams, Hoosic River. $3,697,000 appropriated.

▲† **Massachusetts**—U. S. Eng., 150 Causeway St., Boston, Zone 14, Buffumville Reservoir, Little River, Thames River Basin. $1,117,000 appropriated.

▲† **Massachusetts**—U. S. Eng., 150 Causeway St., Boston, Zone 14, East Brimfield Reservoir, Quinebaug River, Thames River Basin. $1,500,000 appropriated. CD 3/22/45.

▲† **Massachusetts**—U. S. Eng., 150 Causeway St., Boston, Zone 14, dredging Weymouth Fore River, $1,350,000 appropriated.

▲† **Massachusetts**—U. S. Eng., 111 E. 16 St., New York, N. Y., flood control, Hoosic River, Adams, $1,120,000 appropriated.

▲† **Michigan**—U. S. Eng., 600 E. Jefferson St., Detroit, flood control, Battle Creek. $2,000,000 appropriated.

▲† **Michigan**—U. S. Eng., Whitaker Bldg., 600 E. Jefferson St., Detroit, Zone 26, Great Lakes connecting channels, $13,000,000 appropriated.

▲† **Missouri**—U. S. Eng., 911 Walnut St., Kansas City, Zone 6, Pomme de Terre Reservoir, Missouri River, $2,000,000 appropriated. CD 6/1/44.

▲† **Missouri**—U. S. Eng., 420 Locust St., St. Louis, Zone 2, flood control, Cape Girardeau (Reach No. 2 only), Mississippi River, $1,300,000 appropriated. CD 11/7/55.

▲† **New Hampshire**—U. S. Eng., 150 Causeway St., Boston 14, Mass., Otter Brook Reservoir, $2,000,000.

▲† **New Jersey and Pennsylvania**—U. S. Eng., Federal Bldg., Phila., Pa., dredging Delaware River from Trenton, N. J. to Phila., Pa., (40-ft. proj.), $9,000,000 appropriated. CD 7/12/56.

▲† **New Mexico and Colorado**—Bureau Reclamation, Dpt. Interior, Denver Federal Center, Denver, Colo., Navajo Dam, access road, community facilities; Navajo Unit, $1,854,964 appropriated. CD 9/10/56.

▲† **New York and New Jersey**—U. S. Eng., 111 E. 16 St., New York, Zone 3, New York and New Jersey Channels $5,200,000 appropriated.

▲† **North Dakota**—U. S. Eng., Riverdale, Garrison Reservoir $4,500,000 appropriated.

▲† **Ohio**—U. S. Eng., Engineer Park, Buffalo 7, N. Y., Ashtabula Harbor, $1,500,000 appropriated.

▲† **Oklahoma**—Bureau Reclamation, Dpt. Interior, Denver Federal Center, Denver, Colo., Fort Cobb Dam and reservoir and the Foss Dam and reservoir which are the storage facilities, municipal and industrial water facilities in Fort Cobb Division to supply municipal and industrial water to Anadarko and Fort Cobb, Oklahoma from the Fort Cobb Reservoir, Washita Basin Proj. $3,573,000 appropriated. CD 3/21/46.

▲† **Oregon and Washington**—U. S. Eng., City-County Airport, Walla Walla, Wash., John Day Lock and Dam. $1,000,000 appropriated.

▲† **Oregon**—U. S. Eng., Pittock Block, Portland, Hills Creek Reservoir. $4,800,000 appropriated. CD 11/18/55.

▲† **Oregon**—U. S. Eng., Pittock Block, Portland, Cougar Reservoir. $6,570,000 appropriated. CD 7/6/56.

▲† **Pennsylvania**—U. S. Eng., P.O. Box 1715, 24 St. and Maryland Ave., Baltimor 8, Md., Stillwater Reservoir, Lackawanna River, $2,000,000 appropriated.

▲† **Pennsylvania**—U. S. Eng., P. O. Box 8629, Phila., Dyberry Reservoir, Dyberry Creek. $1,500,000 appropriated.

▲† **Pennsylvania**—U. S. Eng., P. O. Box 8629, Phila., Bear Creek Reservoir, Lehigh River, $2,200,000 appropriated.

▲† **Pennsylvania**—U. S. Eng., 925 New Federal Bldg., Pittsburgh, Zone 19, Dam 8, Monongahela River, Point Marion, $1,000,000 appropriated.

▲† **Pennsylvania**—U. S. Eng., 925 New Federal Bldg., Pittsburgh, Zone 19, flood control, Allegheny River Reservoir, $1,000,000 appropriated.

▲† **Tennessee**—U. S. Eng., 306 Federal Office Bldg., Nashville, Cheatham Lock and Dam. $1,375,000 appropriated.

▲ **Texas**—Texas Electric Service Co., c/o J. B. Thomas pres. Electric Bldg., Fort Worth, earth dam on Champion Creek, approx. 8 mi. SE of Colorado City. $1,000,000 Freese & Nichols, 407 Daniger Bldg., Fort Worth, Tex., consult. engrs.

▲† **Texas**—U. S. Eng., foot of Prytania St., New Orleans 9, La., Ferrells Bridge Reservoir, Cypress Creek, Red River Basin, $3,294,000 appropriated.

▲† **Texas**—U. S. Eng., Box 61, Tulsa, Zone 2, Okla. (A) highway bridge at Willis site, $1,000,000 appropriated (B) addnl. recreation facilities $235,000 appropriated, Denison Reservoir.

▲† **Texas**—U. S. Eng., P. O. Box 1229, Galveston, flood control Buffalo Bayou $2,900,000 appropriated. CD 9/14/56.

▲† **Texas**—U. S. Eng., P. O. Box 1229, Galveston, Port Aransas-Corpus Christi Waterway, 36 ft. channel $1,000,000 appropriated.

▲ **Tex., Lockhart**—Plum Creek Conservation Dist., Lockhart Tex., (sponsors) voted $50,000 bonds Aug. 31, flood prevention proj. $2,600,000. CD 11/4/54.

▲ **Tex., Longview**—City, City Hall, Dam or Reservoir No. 2, Lake Cherokee, $1,200,000. CD 10/24.

▲† **Virginia**—U. S. Eng., P. O. Box 119, Norfolk 1, wid'n. 40 ft. channel, Norfolk Harbor, $1,750,000 appropriated.

▲† **Washington**—U. S. Eng., 4735 E. Marginal Way, Seattle, Zone 4, Eagle Gorge Reservoir, Green River, $8,000,000 appropriated.

▲† **Washington**—U. S. Eng., 4735 E. Marginal Way, Seattle, Zone 4, Chief Joseph Dam. $4,800,000 appropriated.

▲† **Washington**—U. S. Eng., 4735 E. Marginal Way, Seattle, Zone 4, imprv. Shilshole Bay, $1,780,000 appropriated.

▲† **Washington**—U. S. Eng., 4735 E. Marginal Way, Seattle, Zone 4, imprv. Bellingham Harbor, $1,078,000 appropriated.

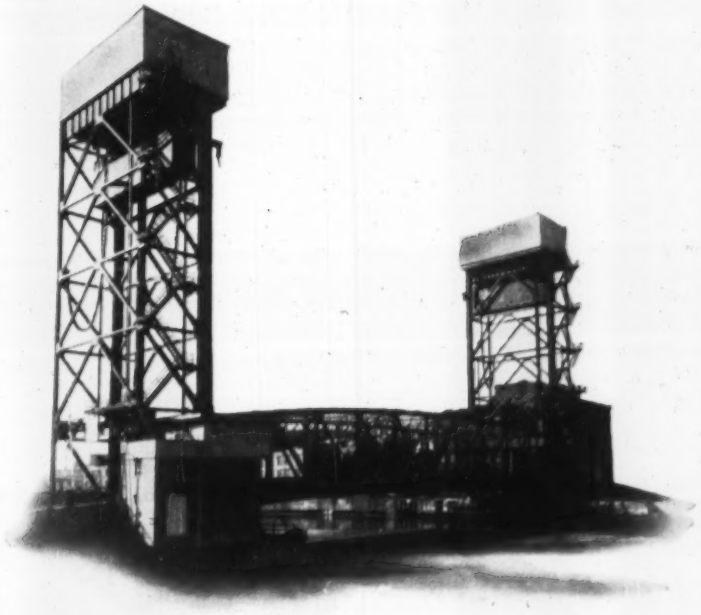
▲† **Washington**—U. S. Eng., Bldg. 602, City-County Airport, Walla Walla, Ice Harbor lock and dam, Columbia River, $18,500,000 appropriated.

PUBLIC BUILDINGS

▲ **Ariz., Phoenix**—OFFICE—State Bldg., Comm., Phoenix, plans by Lescher & Mahoney, Title & Trust Bldg.,

(Continued on page 89)

AND LEVELS IT



The Buffalo, N.Y. South Park Avenue Bridge has plenty of ups and downs, with heavy traffic flow on both roadway and river. The span hoist system includes controls which automatically synchronize fast-acting motor drives in each tower, assuring accurate leveling throughout entire span travel.

This is another instance of the coordinated services Westinghouse offers the construction industry. From original engineering assistance . . . through product selection, delivery and application, Westinghouse teams work closely with you. Let a Westinghouse engineer show you the proof.
Westinghouse Electric Corporation,
Box 868, Pittsburgh, Penna.

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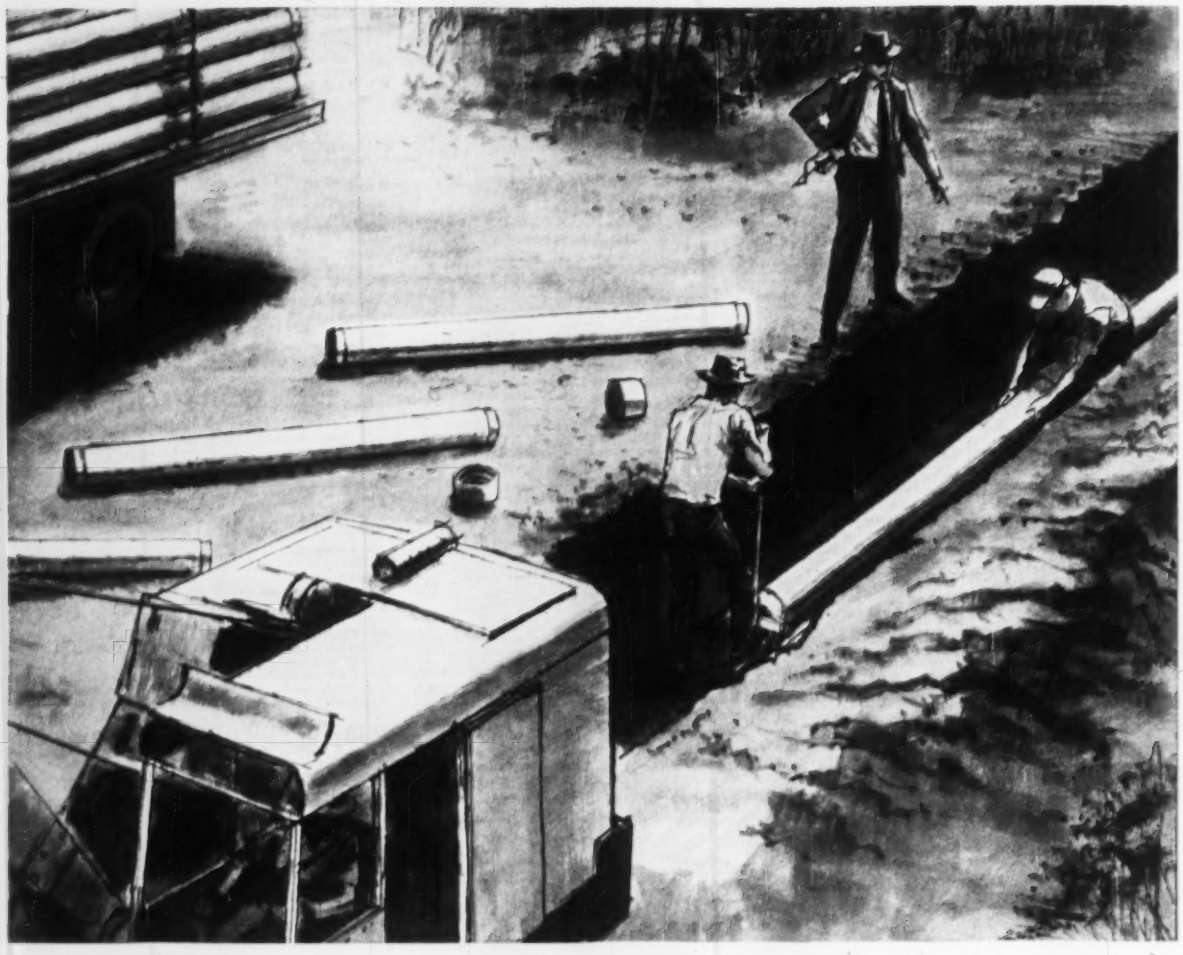

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with Transite and the Ring-Tite Coupling!

Sectional view of Ring-Tite Coupling. Ring is cut away to show how rings are compressed and locked in grooves—*a tight, lasting seal!*

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With Transite® Pipe, installation crews move along fast! So fast, they consistently keep up with the excavator—installing pipe as rapidly as the trench can be opened.

Ease of handling and simplified assembly explain these advantages. Light in weight, Transite is easier to truck, easier to handle on the job. With the Ring-Tite® Coupling only simplest tools are needed for joining—pipe ends are automatically positioned within the coupling to allow for expansion.

So save while you assure city officials and engineers top economy, long trouble-free performance with Transite. For its smooth interior (flow coefficient is C=140) *often* permits selection of smaller diameter pipe . . . *always* keeps pumping costs low. And since Transite can't tuberculate, water systems can be designed without allowing for future flow reduction caused by that form of interior corrosion.

Let us send you further information on Transite asbestos-cement Pressure Pipe and the Ring-Tite Coupling. Write for booklet, TR-160A, Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.

JOHNS MANVILLE JM PRODUCTS

Johns-Manville TRANSITE PRESSURE PIPE

(Continued from page 87)

two 3 story wings at State Office Bldg. with underground connecting tunnels, $2,000,000. CD 8/28.

▲† **Ark., Hot Springs**—POST OFFICE, etc.—General Services Admin., 1114 Commerce St., Dallas, Tex. plans by Wittenberg, Delony & Davidson, Pyramid Life Bldg., Little Rock, U. S. Post Office and Court House on site of Eastman Hotel. $1,729,000. CD 10/15/45.

▲† **Ark., Little Rock**—POST OFFICE, etc.—General Service Admin., 1114 Commerce St., Dallas, Tex., post office and court house annex, adjacent to present post office bldg. $9,000,000.

▲ **Del., Wilmington**—HOUSING—Wilmington Housing Auth., 1400 Todds Lane, 400-unit low-rent public housing to be known as "Riverside". $4,500,000-$5,000,000. Bids about Nov. 1.

▲ **Fla., Raiford**—PENITENTIARY—State Prison Bd., Tallahasee, plans by Kemp, Bunche & Jackson, archts., 33 S. Hogan St., Jacksonville, and George Aderhold, consult. archt., 513 N. Broadway, Oklahoma City, Okla., state penitentiary. $15,000,000.

▲ **Idaho, Lewiston**—SCHOOL—School Bd., $1,500,000 bond election Nov. 5, 2 junior high schools, each costing $650,000. Culler, Gale, Martelland & Norrie, Realty Bldg., Spokane, Wash., archts. CD 5/29.

▲ **Ky., Lexington**—MEN'S DORMITORY—Commonwealth of Ky. Div. Purchases, Frankfort, plans by John F. Wilson & Assocs., 508 E. Mai St., 3 storyy, brick, stone men's dormitory, University of Kentucky. $1,800,000. CD 10/2/51.

▲ **Mass., Lexington**—SCHOOL—Town, Supt. Schools, 1475 Massachusetts Ave., plans by Charles H. Cole, 55 Waltham St., Junior High School, off Burlington and Adams Sts. $2,000,000.

▲ **New York**—SHOP, etc.—Dpt. P. Wks., Municipal Bldg., New York, Zone 7, plans by Eellheimer & Wagner, 155 E. 42 St., New York, Zone 17, Proj. S-134, central repair shop and garage for Districts 53, 54 and 55 for Dpt. Sanitation, Queens Boro. $14,900,000. CD 8/8.

▲ **N. Y., Brooklyn**—SCHOOL—Bd. Educ., 42-15 Crescent St., Long Island City, plans by Keally & Patterson, 17 E. 49 St., New York, Zone 17, George Westinghouse Vocational High School addn. and modernization, Proj. F-368. $4,550,000. CD 5/20.

▲ **N. Y., Brooklyn**—HOSPITAL—Dpt. P. Wks., Municipal Bldg., New York, Zone 7, plans by Ferrenz & Taylor, 152 W. 42 St., New York, Zone 36,, 5 story Cumberland Hospital addn., modernization N. Portland Ave. and Auburn Pl., Proj. HO-230. $6,970,300. CD 6/5.

▲ **N. Y., New York**—SCHOOL—Bd. Educ., 45-12 Crescent St., Long Island City, plans by Wechsler & Schimenti, 118 E. 25 St., Zone 10, Proj. E-870, Junior High School 171, conversion and modernization, 103 St. east of 5 Ave. $1,360,000. CD 5/29.

▲ **N. Y., New York**—SCHOOL—Bd. Educ., 45-12 Crescent St., Long Island City, plans by Urbahn, Brayton & Burrows, 654 Madison Ave., Zone 21, Proj. E-415, P.S. 148, vicinity of 9th St. and Lexington Ave. $3,000,000. CD 5/30.

▲ **N. Y., New York**—SCHOOL—Bd. Educ., 42-15 Crescent St., Long Island City, plans by Cavaglieri & Salerni, 24-16 Bridge Plaza South, Long Island City, Proj. E-422, Junior High School 99, modernization and conversion, 100 St. and First Ave. $1,100,000. CD 5/29.

▲ **N. Y., New York**—OFFICE, etc.—Dpt. P. Wks., Municipal Bldg., Zone 7, plans by deYoung, Moscowitz & Rosenberg, 205 E. 42 St., Zone 17, office of chief medical examiner and related facilities, site given to city by New York University, at northeast corner of 1 Ave. and E. 30 St., Proj. CME-1. $2,600,000.

▲ **N. Y., New York**—APARTMENT—New York City Housing Auth., 229 Broadway,, Zone 7, 17 story apartment for 360 "aged" families, north side of E. 104 St. at Second Ave., across 104 St. from northern boundary of George Washington Houses. $3,500,000.

▲† **O., Sandusky**—REACTOR—National Advisory Com. for Aeronautics, Lewis Flight Propulsion Laboratory, Cleveland, O., 60,000 kw. reactor at Plum Brook Ordnance Works, near here. $10,735,000. Applied to AEC for license.

▲ **Tex., Huntsville**—DORMITORY, etc.—Sam Houston State Teachers College, Huntsville, Women's Housing or Dormitory Units No. 1 $1,750,000; No. 2 $2,250,000; Men's Housing or Dormitory Units No. 1 $2,000,000; No. 2 $2,000,000; Classrooms Bldg. No. 1 $500,000; No. 2 $600,000; No. 3 $450,000; No. 4 $725,000; boiler or heating plant tunnels $250,000; gymnasium $450,000; science $475,000; laboratory $550,000.

▲ **Ont., Fort William**—GENERATING STATION—Hydro-Electric Power Comn. of Ontario, 620 University Ave., Toronto, thermal-electric generating station initial capacity of 100,000 kilowatts with provision for enlargement to 1,000,000 kilowatts as required, will supply power to area of 98,000 sq. miles from Marathon to east of Manitoba border on the west. $26,000,000.

COMMERCIAL BUILDINGS

▲ **Ark., Little Rock**—SHOPPING CENTER—Village Shopping Center, Paul Spikes, c/o Ginocchio, Cromwell & Assocs., archts., 416 Center St., 110,000 sq. ft. floor space shopping center, on 17 acre tract at Asher

DUMPCRETES help solve heavy traffic problem on DETROIT EXPRESSWAY job

The Cooke Contracting Company worked Dumpcretes during off-peak traffic hours to average 2500 feet of concrete pavement per day in widening Detroit Industrial Expressway. Highway Department check showed 500 vehicles passing the paving site *each hour*. 14 miles of 8′ to 12′ widths totalled 110,000 sq. yds.—hauled and placed by 6 Dumpcretes from central plant.

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and Hayes Sts. $2,000,000. Bids 1st phase in October or November. CD 2/21/55.

▲ **Calif., San Francisco**—HOTEL—Hilton Hotels, 401 7th Ave., New York, N. Y., 20 story hotel. $20,000,000.

▲ **Colo., Wheatridge**—PROFESSIONAL—Markets, Inc., Equitable Bldg., Denver, (Gerri Von Frellick, pres.) 10 story, approx. 40,000 sq. ft. Lakeside Professional Bldg. $1,500,000.

▲ **Conn., Hartford**—APARTMENT—Cheri Ann Towers, c/o Aaron Dubitzky, 18 Pontiac Rd., West Hartford, plans by Berenson & West Assoc., 19 Woodlawn St., 10 story apartment, 393 Farmington Ave. $2,000,000. CD 8/16/56.

▲ **Conn., Stamford**—APARTMENT—Glenbrook Road Realty, Inc., Jane's Lane, plans by Philip Birnbaum, 12 E. 48 St., New York, N. Y., 140-unit apartment, Glenbrook Rd. $1,200,000.

▲ **Mass., Brockton**—SHOPPING CENTER—Owner, c/o William C. Bearse, 86 Main St., plans by C. L. Ray, designer, 1972 Broad St., Cranston, R. I., "Brockton Plaza" Shopping Center, incl. 21 stores and 1,008 car parking area, Routes 27 and 123. $1,500,000.

▲ **Mich., Bay City**—STORE, etc.—Sears, Roebuck & Co., 925 S. Homan St., Chicago, Ill., retail store and warehouse, 500-car parking lot, McKinley and Saginaw Sts. $1,750,000.

▲ **N. Y., Port Chester**—HOUSING—Middle Income Land Co., c/o Irving Margon, archt., 18 E. 41 St., New York 17, N. Y., co-operative housing at South Regent St. and Boston Post Rd. $1,200,000.

▲ **Pa., Monroeville (Branch Turtle Creek)**—ACADEMY—Sisters of Mercy, 3333 Fifth Ave., Pittsburgh, Zone 13, Our Lady of Mercy Academy, novitiate and Mother House, all on 56 Acre plot in University Park Development, University Park. $1,000,000.

▲ **Tex., Abilene**—SCIENCE, etc.—McMurry College, Methodist Church, S. Abilene St., science bldg., $1,000,000 (bldg. only) 150 capacity resident girls dormitory, $600,000; library bldg., $600,000.

▲ **Tex., Dallas**—CHAPEL, etc.—Southern Methodist University, Campus, Dallas, chapel and religious bldg., $750,000; women's dormitory, $1,500,000. CD 3/4/53.

▲ **Tex., Fort Worth**—TELEPHONE BUSINESS—Southwestern Bell Telephone Co., 308 S. Akard St., Dallas, plans by Wyatt C. Hedrick, Box 765, 12th Floor T&P Bldg., 9 story, masonry type telephone business bldg., between 10th and 11th Sts. and Houston and Throckmorton Sts. $7,700,000. CD 10/16.

▲ **Tex., Houston**—CHURCH PLANT—East Haven Baptist Church Congregation, c/o Joe T. Strother & Reece Brentzel, archts., 2501 Van Buren, church plant addn. $1,750,000.

▲ **Tex., Houston**—HOTEL—Rice Hotel, Main and Texas Sts., plans by J. Russ Baty, c/o Bankers Mtg. Bldgs., 4 or 5 story hotel annex with bsmnt., with fdn. sufficient to support 10 story structure. $3,000,000. Bids in 90 days. CD 4/15.

▲ **Tex., Weslaco**—HOSPITAL—Mid-Valley Hospital Comm., c/o H. Raymond Mills, chm., Weslaco, plans by R. Newell Waters, Clark & Tomlinson, 1st National Bank Bldg., 150 bed hospital on 20 acre site to be operated by Methodist Church $2,250,000. CD 8/2, under Southwest Texas Methodist Conference, as owner.

▲ **Va., Shirlington (Sta. Arlington)**—DEPARTMENT STORE—Lansburgh's Dpt. Store, 7th and E. St. N. W., Wash., D. C., plans by Thalheimer & Weitz, 1315 Walnut St., Phila., Pa., 150,000 sq. ft. department store, incl. air-conditioning, parking area, etc. $3,000,000.

▲ **Wis., Milwaukee**—BIOLOGY—Marquett University, 615 N. 11 St., plans by Brust & Brust, 135 W. Wells St., Zone 3, biology bldg. $1,000,000. CD 11/17/55.

▲ **Wis., Milwaukee**—SHOPPING CENTER—Milwaukee Shopping Centers, 749 2 St., Zone 3, plans by Sidney H. Morris & Asssocs., 134 N. LaSalle St., Chicago, Ill., Bradley Village Shopping Center. $1,250,000. Bids about Dec. 1957.

▲ **B. C., New Westminister**—HOTEL, etc.—New Westminister Hotel Syndicate, c/o 2594 W. Broadway, Vancouver, plans by Hale & Harrison, 2594 W. Broadway, Vancouver, 5 story hotel section and 3 story office portion, rein.-con. structure, Lorne and Carnarvon Sts. $1,000,000.

▲ **Ont., Toronto**—RESIDENCE, etc.—St. Michael's College, St. Mary St., plans by Brennan & Whale, 1221 Bay St., 5 story residence, incl. library, offices and dining room, north side St. Mary St. $1,300,000. To be ready for 1959-60 school year.

UNCLASSIFIED

▲ **Mo., Kansas City**—STEEL MILL—Sheffield Steel Div. of Armco Steel Corp., Sheffield Station, Kansas City, Mo., steel mill just east of present Sheffield plant at Sheffield Station. $10,000,000.

▲ **O., Cincinnati**—LABORATORY, etc.—Proctor & Gamble Co., Gwynne Bldg., plans by Schmidt, Garden & Erikson, 104 S. Michigan St., Chicago, Ill., products laboratory offices, development laboratories and service facilities. $7,000,000.

▲ **Pa., Blawnox (Branch Pittsburgh)**—PARK—Allegheny Industrial Park Corp., Oliver Bldg., Pittsburgh, Zone 22, 46 acre landscaped park for light industry, warehouses, with utilities and access to rail, river and highway. $3,000,000. Green Eng. Co., 504 Beaver St., Sewickley, archt.

▲ **Tex., Robert Lee**—POWER PLANT—West Texas Utilities Co., 1062 No. 3rd St., Abilene, power plant, Oak Creek Lake. $12,000,000 (part of 5 year program).

▲ **Tex., Stamford**—PLANT—West Texas Utilities Co., Cal Young, pres., 1062 N. 3rd St., Abilene, major steam unit plant, Paint Creek, $3,000,000, steam turbine unit at Lake Stamford $1,500,000 (part of 5 year program). CD 3/14/52.

UNCLASSIFIED

▲ **Colorado**—METERING STATIONS, etc.—Bureau Reclamation, Dpt. Interior, Denver Federal Center, Denver, installing 5 metering stations, taplines and sub-stations, Sterling Sub-station addn., Erie, Longmont, Limon & Loveland Sub-stations addns. and reconductoring Greeley-Beaver Creek 115-kv. transmission line, Transmission Division, $1,281,000 appropriated.

▲ **Ill., Chicago**—PIER—City, City Hall, addn. to Navy Pier and constr. new pier in preparation of ocean shipping via St. Lawrence Seaway. $23,500,000. Tippetts-Abbott-McCarthy & Stratton, 72 W. 47 St., New York, N. Y., consult. engrs.

▲ **Minnesota**—TRANSMISSION LINE—Bureau Reclamation, Dpt. Interior, Denver Federal Center, Denver, Colo., 165 mi. Fargo-Granite Falls 230 kv. transmission line and Grand Forks Sub-station, $2,617,000 appropriated.

▲† **North Dakota**—TRANSMISSION LINES—Bureau Reclamation, Dpt. Interior, Denver Federal Center, Denver, Colo., 203 mi. 231kv. Dawson County-Bismarck transmission line and addns. at Fargo sub-station $1,361,000 appropriated.

▲ **North Dakota**—TRANSMISSION LINES, etc.—Bureau Reclamation, Dpt. Interior, Denver Federal Center, Denver, Colo., Utica-Junction-Sioux Falls 67 mi. 230-kv. transmission line and addns. at Granite Falls, Summit, Sioux City and Sioux Falls Sub-stations $3,968,850 appropriated.

▲ **Texas-New Mexico**—PRODUCTS LINES—Emerald Pipe Line Corp., Sunray, 120 mi. 6 in. products line, Sunray Tex. to Tecumcari, N. M. $1,200,000.

▲ **Texas**—RURAL DISTRIBUTION LINES—West Texas Utilities Co., Cal Young, pres., 1062 N. 3 St., Abilene, bldg. high voltage transmission lines mostly connecting power plants and load centers, $11,500,000. general rehabilitation and sys. repairing work $1,500,000. constr. and imprv. power distr. facilities $15,000,000, all in area of Abilene, (part of 5 year program). CD 2/15.

▲ **Tex., Port Lavaca**—FAIRGROUNDS—Calhoun Co., c/o Comrs. Court, Courthouse, fairgrounds imprv., incl. pens, arena, rodeo grounds, barns, storage, loading and unloading facilities, etc. $1,000,000.

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AUSTIN-WESTERN HYDRAULIC CRANE

HUNKIN-CONKEY REPORTS: A-W proves versatility, speed and economy on tough contracting jobs

Early in 1956, The Hunkin-Conkey Construction Co., a major contractor with home offices in Cleveland, undertook a reconstruction job at one of that city's large steel plants. Time studies showed that 95% of the lifts were within the 5-ton range, so a diesel-driven Austin-Western unit was purchased. It was equipped with an 18-ft. extensible boom and 6-ft. manual extension, plus 4-wheel drive, 4-wheel power steer and hydraulic outriggers.

The Company says: "During the first year of use, this crane operated on an average of 2 shifts a day with complete success. Because the construction contractor meets so many different operating conditions, versatility in a machine is most desirable. We found this quality built into our Austin-Western."

Does many jobs well. "With it we install such equipment as conveyors, motors and pumps . . . We use it with a hitch to haul trailers with up to 5 tons of reinforcing steel, and sometimes have hauled as many as 5 trailers in a string . . . In restricted areas we use it to pour concrete brought up from our redi-mix plant in trucks. Maintenance men use it for changing tires or wheels in the yard or out on a job, and to remove engines for maintenance or repair . . . It is a handy emergency unit to have in the equipment storage yard when not out on a job."

Safer to operate. "We find the A-W safer to operate, particularly in congested areas, because it permits less swing of the load. Its boom responds instantly to the operator's touch. The boom also hydraulically extends and retracts while rotating and raising or lowering."

Costs less than half one man's wage. "Our cost record shows a total machine cost, exclusive of overhead, of only $12.11 a day, less than half the operator's wages. The cost, with the operator's wage included, is just over $5 an hour."

For the complete Hunkin-Conkey story, ask for Gould Certified Report No. 5703.

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Power Graders • Motor Sweepers • Road Rollers • Hydraulic Cranes

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Construction Equipment Division
OTHER DIVISIONS: Eddystone • Lima • Electronics & Instrumentation • Hamilton • Loewy-Hydropress • Standard Steel Works • Madsen • Pelton
AURORA, ILLINOIS, U.S.A.

Working on the distribution system for the Trans-Canada natural gas pipeline, this new Barber-Greene Model 774 Ditcher cuts through clay frozen to a depth of five feet at temperatures around 26° below zero.

New ditcher wheels through frozen clay at 26° below zero

Working every day for two sub-zero months, this new Barber-Greene Model 774 wheel-type ditcher was subjected to operating conditions far beyond any likely to be encountered in normal use. It cut through clay frozen to a depth of five feet in temperatures as low as 26° below zero. Only four days during the entire period did the mercury rise above zero.

Operated by G. M. Gest Construction Ltd., Montreal, the new ditcher was put through this grueling test in Manitoba on a vital phase of the Trans-Canada natural gas pipeline distribution system.

Digging 22 inches wide and four feet deep, the Model 774 averaged over three feet per minute in these extreme conditions.

This ditcher is completely new:

- New digging-wheel drive through telescoping shaft, floating differential, and split No. 1 shaft
- New flexible connection between chassis and boom
- New dual-range Hydra-Crowd for fastest crowding in every digging condition
- New electric overload protection
- New all-hydraulic spoil conveyor
- New hydraulic controls for easier, more accurate operation

Write for literature on the most up-to-date ditcher made. 57-9-D

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AURORA, ILLINOIS, U.S.A.

CONVEYORS...LOADERS...DITCHERS...ASPHALT PAVING EQUIPMENT

Bids—Low Bids—Contracts—Second Section

NEW ENGLAND

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
October 8 Massachusetts

HEAVY CONSTRUCTION—LB & CA

▲ **Savin Brothers, Inc.**, 410 Asylum St., Hartford, Conn. CA $3,655,046, New Founders Bridge approaches and connectors, Hartford Side, 1,600 ft. c. conc. on riverfront section of Hartford-Springfield Expressway, north and south roadways, ramps and viaducts, HARTFORD, CONN. The Greater Hartford Bridge Auth., 71 Capitol Ave., Hartford, Conn. Bids Aug. 19. CD 8/22, under LB.

BUILDINGS—LB & CA

▲ **L. & R. Constr. of Medford**, 84 Main St., North Reading, Mass. CA $2,119,207, est. $2,000,000 NORTH JUNIOR HIGH SCHOOL, Oak St., BROCKTON, MASS. City, Richard E. Samuelson, Inspector Bldgs., City Hall, Brockton, Mass. Bids Sept. 6. CD 9/12, under LB.

▲ **Fluor Corp., Ltd.**, 2500 S. Atlantic Blvd., Los Angeles, Zone 22, Calif., CA Est. $50,000,000, design and constr. REFINERY, 43,000 bbls. per day, incl. boiler plant, salt water cooling sys., tank farm and docks, JAMESTOWN, R. I. Commerce Oil Refining Corp., 515 Madison Ave., New York, N. Y. CD 12/20/55, under CA, R. I., Portsmouth.

▲ **Edwin Moss & Son, Inc.**, 555 Grant St., Bridgeport, Conn., CA $11,305,480 (6 bidders) 9 story OFFICE, Oak St. Redevelopment Project, NEW HAVEN, CONN. Southern New England Telephone Co., 227 Church St., New Haven, Conn. Bids Sept. 17. CD 8/23.

▲ **George L. Hickey, Inc.**, 13 Spring St., Stamford, Conn. LB $2,569,890. (7 bidders), J. M. Wright Technical SCHOOL,BI-R-134, STAMFORD, CONN. State P. Wks., 165 Capitol Ave., Hartford, Conn. Bids Sept. 18. CD 8/23.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
October 11 Pennsylvania
STREETS AND ROADS
October 1 New Jersey — October 11 Pennsylvania

BUILDINGS—BA

▲ **N. J., Newark** OFFICE, etc.—BA About 10/15—Prudential Life Insurance Co., 763 Broad St., 24 story home office, 753 Broad St., $20,000,000; 7 story office, South Bldg., 763 Broad St., $3,000,000. Voorhees, Walker, Smith & Smith, 101 Park Ave., New York, N. Y., archts. CD 5/11/56.

▲ **D. C., Wash.**—HOUSING—BA 10/17—National Capitol Housing Auth., 1729 New York Ave. N.W., Wash., D. C., 422-dwelling units, Housing Project DC-1-19, Kenilworth Courts. Plans deposit $50. L. Justement, 2011 "K" St. N.W., Wash., D. C., archt. CD 8/29/52.

BUILDINGS—SLC

▲ **Pa., Pittsburgh**—HOTEL—Hilton Hotels Corp., 401 7th Ave., New York, N. Y., soon lets contract Pittsburgh Hilton Hotel, $15,000,000. Seeley, Stevenson, Value & Knecht, engrs., 101 Park Ave., and William Tabler, archt., 401 7th Ave., both New York, N. Y. CD 8/23.

BUILDINGS—LB & CA

▲ **Ben Rabiner Associates**, c/o Henry A. Klar Realty Co., Horace Harding Blvd., Bayside Hills, N. Y., Owner-Builds. $2,160,000. 120 HOMES at Park Ridge Con. 226 St. and Conduit Ave., LAURELTON, N. Y.

▲† **U. S. Eng.**, 2635 Abbotsford Rd., Phila., Pa., cancelled bids to have been opened Oct. 16, constr. Capehart permanent family housing at Fort Dix Military Reservation, approx. 1 mi. southeast on Juliustown Rd. from New Jersey Route 38. Burlington Co., ENG-36-109-58-5, FORT DIX, N. J. Est. $8,500,000. CD 9/11.

▲ **Harold Kramer & Vincent Cucchiara**, 780 Anderson Ave., Cliffside Park, N. J., Own Forces. $3,600,000. 113 HOUSES, Lafayette Ave. off Schrabenburg Rd., forming Longview Estates, HARRINGTON PARK, N. J. Rudolph Novak, 89 Central Ave., Clifton, N. J., archt.

▲ **Gail Constr. Corp.**, 245 Raritan Ave., Highland Park, N. J., Own Forces. $7,000,000. 2nd section of 100 HOUSES in a 800 house development 4 mi. south of Toms River, Sloop Creek Estates, at Boyville, TOMS RIVER, N. J. Paul B. West, 911 North Main St., Toms River, N. J., archt.

▲ **Somers Bros. Constr. Co.**, U. S. Hy. 1, Iselin, N. J., CA $8,000,000, erecting refinery for fuel oil on Arthur Kill, WOODBRIDGE, N. J. Hess Trading & Transport, Inc., State St., Perth Amboy, N. J.

▲ **B. Bornstein & Son**, 2027 Arch St., Phila., Pa., CA $2,119,500, est. $3,000,000 Wanamaker JUNIOR HIGH SCHOOL, PHILA., PA. Bd. Educ., 21 and Winter Sts., Phila., Pa. Bids Aug. 23. CD 7/26.

▲ **Nason & Cullen**, 6522 Vine St., Phila., Pa., CA $3,700,000 HOSPITAL, HEALTH SERVICE BLDG., PHILA, PA.: Lankenau Hospital, Lancaster Ave., Overbrook, Pa. CD 7/8/55.

SOUTH

HEAVY CONSTRUCTION—LB & CA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
October 4 Kentucky

BUILDINGS—BA

▲ **Fla., Miami**—HOUSING—BA 10/9—Miami Housing Auth., J. T. Knight, exec. dir., 327 N.W. 62 St. S., housing, incl. 148-units. Plans deposit $75. Steward & Skinner, 223 S.E. 1 St., archts. H. B. Marx & Assocs., 832 Forsyth Bldg., Atlanta, Ga., landscape archts: Winston C. Gardner, 7575 S. 47 Ave., structural engr. Maurice H. Connell & Assocs. Inc., 315 N.W. 27 Ave., mech. engr. CD 9/19/56.

▲ **Ky., Lexington**—MEDICAL SCHOOL—BA About 11/15—Commonwealth of Ky., Div. Purchases, Frankfort, first unit, 6 story, brick, stone, rein.-con. Medical Science Bldg., University of Kentucky Medical School. $6,000,000. Meriwether Marye Assocs., 248 E. Short St., archts. Proctor-Ingles, 915 S. Limestone St., engrs. CD 6/6.

BUILDINGS—LB & CA

▲ **Procon, Inc.**, 1111 Mt. Prospect Rd., Des Plains, Ill., CA Est. $4,500,000. CHEMICAL PLANT, incl. water and sewerage treatment facilities, plant water pumping facilities, offsite piping and tank car cleaning facilities, PLAQUEMINE, LA. Dow Chemical Co., Commerce Bldg., Baton Rouge, La. CD 1/25.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
October 1 Michigan
STREETS AND ROADS
October 2 Michigan

HEAVY CONSTRUCTION—LB & CA

▲ **OHIO**—Dpt. Hys., Columbus, Zone 15,
O.—**Claude A. Janes, Inc.**, Box 127, Chesterhill, O., CA $969,899, est. $941,100, Type T-35 on B-20 and structures, Village of Clarington and Salem Twps., S.R. 78, Sections (28.70-33.82), S-572 (11), Monroe Co.;
O.—**S. J. Groves & Sons Co.**, 500 Wesley Temple Bldg., Minneapolis, Minn., CA $2,837,686, est. $3,109,000 Type T-71 and structures, Congress Twp., S.R. 1, Section 1.36, I-1105(1), Wayne Co.;
O.—**C. F. Replogle Co.**, Box 308, Circleville, O., CA $1,409,560, est. $1,512,600, Type T-71 and structure, Richland Twp., Villages of Rushville and West Rushville, U.S.R. 22, Sections 23, 56, Fairfield Co. Grand total $5,217,145. Bids Aug. 20. CD 8/30, under LB.

▲ **OHIO**—State Dpt. Hys., Columbus, Zone 15. Bids opened 9/17,
O.—**J. A. Jones Co.**, 209 W. 4 St., Charlotte, N. C., LB $2,970,931, est. $3,397,500, (11 bidders) 4.3 mi. stretch of Ohio North-South Freeway, Delaware Co.;
O.—**Nick Cenci & Sons, Inc.**, 844 N. Cassady Ave., Columbus, O., LB $1,633,954, est. $1,719,900 (7 bidders) four lane 1.4 mi. expressway at Lancaster, Fairfield Co. CD 8/30.

▲ **ILLINOIS**—Illinois State Toll Hy. Comn., 20 N. Wacker Dr., Chicago,
J. M. **Corbett Co.**, 2500 S. Corbett Ave., Chicago, Ill., CA $2,097,563, Contr. T-1-D grading, drainage, paving, seeding, constr. appurts., erec. precast conc. and structural steel bridge 0.29 mi. W. of Calumet Expressway, ext. westerly W. of Grand Trunk and Western RR Cook Co. Bids Aug. 29, awarded Sept. 13. CD 9/5, under LB.

▲ **Santucci Constr. Co.**, 5025 Church St., Skokie, Ill., Louis Garavaglia, 24240 Mound Rd., Center Line, Mich. and Fattore Co., 6500 11-Mile Rd., Center Line, Mich., LB $11,982,000 water intake structure, incl. rock tunnel and land tunnel, open caisson, DETROIT, MICH. Wayne Co. Bd. Road Comrs., City-County Bldg., Detroit, Mich. Bids Sept. 11. CD 8/2.

BUILDINGS—LB & CA

▲ **Power Constr. Co.**, 125 So. Marion St., Oak Park, Ill., LB $2,307,276, ADMINISTRATION BLDG. and CENTRAL SHOP BLDG., near Villa Park, DuPage Co., ILLINOIS. Illinois Toll Hy. Comn., 20 N. Wacker Dr., Chicago, Ill. CD 8/23.

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
October 3 Kansas — October 15, 16 Texas
STREETS AND ROADS
October 1 Colorado — October 3 Kansas
October 15, 16 Texas

BUILDINGS—BA

▲ **Minn., Minneapolis**—HOSPITAL, etc.—BA 10/8—Swedish Hospital, 914 S. 8 St., one unit, addns., alterations, 1 story, bsmt., 100x150 ft. and addn. of 9th and 10th floors 47x234 ft. each, hospital, $2,000,000. Lang & Raugland, 802 Wesley Temple Bldg., archts.

HEAVY CONSTRUCTION—LB & CA

▲ **National Tank & Boiler Co.**, 1822 Cherry St., St. St. Louis 20, Mo., LB $2,658,726 Section 1; LB $1,474,126, Section 2 (3 bidders each) furnishing welded steel pipe for water division, to be installed between Chain of Rocks Water Works Pumping Station to Bissell's Point Station and second section to Baden pumping station to connect with existing distr. lines, S. LOUIS, MO. City, Bd. P. Service, City Hall, 12 Blvd. and Market St., St. Louis 3, Mo. Bids Sept. 17. CD 8/20.

▲ **TEXAS**—State Hy. Comn., Austin, Bids opened 9/17,
Tex.—**Cage Bros.**, 6459 San Pedro Ave., San Antonio, Tex., LB $3,244,925, flex. base course, c. conc. pavt., hot mix b. conc. 6.509 mi. US 75, Proj. I 1108 (1), Walker Co.; LB $1,934,899, grading, structures, base and surf. 15.931 mi. Hy. US 90, Proj. I 235 (29), Howard Co.;
Tex.—**E. W. Hable & Sons**, P. O. Drawer 650, Corsicana, Tex., LB $148,713, grading, structures, base and surf. 6.405 mi. Hy. FM 489, Proj. S. 2226 (1), Freestone Co.;
Tex.—**Southwestern Constr. Co.**, 1219 Cotton Exchange Bldg., Dallas, Tex., LB $132,711, grading, structures, base and surf. 5.405 mi. Hy. FM 939, Proj. S. 1500 (1), McLennan Co.;
Tex.—**Perry Constr. Co.**, 501 Insurance Bldg., San Antonio, Tex., LB $228,815, grading, structures 4.874 mi. Hy. FM 521, Proj. S. 679 (2), Matagorda Co.;
Tex.—**Border Constr. Co.**, P. O. Box 647, Laredo, Tex., LB $120,114, flex. base, two course surf. treatment 9.083 mi. Hy. FM 689, Proj. S. 2075 (3), Medina Co.;
Tex.—**W. R. Boyd, Inc.**, P. O. Box 408, Center, Tex., LB $105,623, grading, structures, base and surf. 3.05 mi. Hy. FM 2259, Proj. S. 2016 (2), Nacogdoches Co.;
Tex.—**Austin Bridge Co. & Austin Road Co.**, P. O. Box 1590, Dallas, Tex., LB $1,197,063, c. conc. pavt. 2.457 mi. Hy. US 75, Proj. I 370 (3), Montgomery Co.;
Tex.—**R. B. Butler, Inc.**, P. O. Box 471, Bryan, Tex., LB $510,741, flex. base, b. conc. 1.968 mi. Hy. US 190, Proj. F 490 (12), Brazos and Madison Counties;
Tex.—**J. R. Canion, Jr., Inc.**, Wassom Rd., Austin, Tex., LB $116,420, grading, structures, base and surf. 9.244 mi. Hy. RM 1871, Proj. S. 2171 (1), Mason Co. CD 8/23.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
October 9, 16 California
STREETS AND ROADS
October 9, 10, 16, 17, 24, California

HEAVY CONSTRUCTION—LB & CA

▲† **J. W. Briggs**, Bend, Ore., LB $1,527,020 (14 bidders) relocating U. S. Forest Service road west side dam to Annie Creek, Cougar Reservoir, Lane Co., CIVENG-35-026-58-20, OREGON. U. S. Eng., Pittock Block, Portland, Ore. Bids Sept. 12. CD 8/15.

CANADA

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
October 2, 9 Ontario

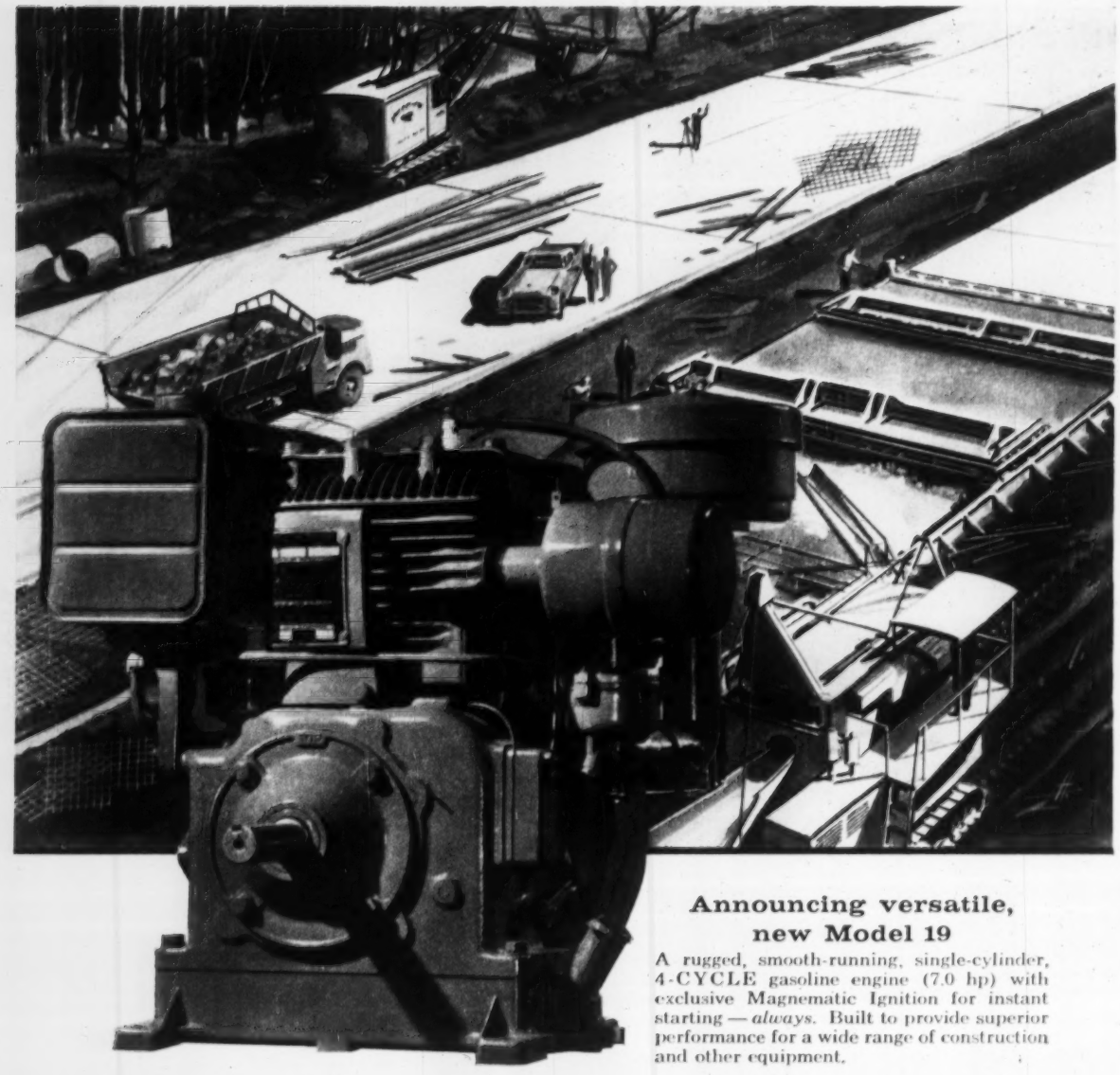
HEAVY CONSTRUCTION—LB & CA

▲ **The Foundation Co. of Ontario Ltd.**, 1220 Bay St., Toronto, Ont., CA $2,731,294 (6 bidders) Humber River Sanitary Trunk Sewer (b) extending westerly and northerly from point on Riverwood Parkway to Lambton Golf Course; approx. 11,498 lin. ft., two contracts, TORONTO, ONT. Municipality of Metropolitan Toronto, 67 Adelaide St. E., Toronto, Ont. Bids July 22, awarded Sept. 11. CD 8/28, under LB.

BUILDINGS—LB & CA

▲ **Dell Constr. Co. Ltd.**, 2461 Bloor St. W., Toronto, Ont., LB $2,998,449 (7 bidders) Tender No. 2, 29 semi-detached houses and 229 row-houses in 35 blocks of low rental HOUSING, Lawrence Ave. W. area, TORONTO, ONT. Ontario Dpt. Planning & Development, Queen's Park, and Municipality of Metropolitan Toronto, 67 Adelaide St. E., both Toronto, Ont. and Central Mortgage & Housing Corp., 56 Lyons St., Ottawa, Ont. Bids Aug. 20. CD 8/1.

(Proposal Advertisement see pp. 105 to 107)



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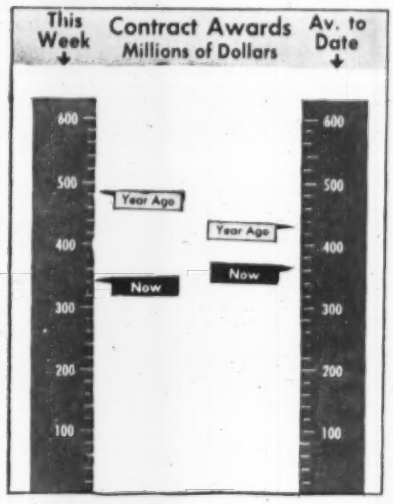
Construction Scoreboard

Activity this Week



AMOUNT OF CONTRACTS LET

By Ownership	This Week	Cum. 39 wks 1957	Chge '56-'57
	millions		%
Federal	$24.5	$1,896.0	+44
State and Municipal	131.4	5,646.9	+16
Total Public	155.9	7,542.9	+22
Total Private	186.4	6,544.3	−37
U. S. Total	$342.3	$14,087.2	−15
By Type of Work			
Waterworks	$6.1	$262.0	....
Sewerage	22.4	424.9	−7
Bridges	13.5	547.8	+22
Highways	52.6	2,352.9	+29
Earthwork, Waterways	5.7	852.8	+47
Buildings:			
Public, Excl. Housg.	32.1	1,718.6	+11
Public Housing	19.7	518.8	+112
Private Housing	87.0	2,307.3	−46
Commercial	33.2	1,338.9	−5
Industrial	64.1	2,525.6	−39
Unclassified	5.9	1,237.6	−7
U. S. Total	$342.3	$14,087.2	−15

NOTE: Minimum size projects included are: Waterworks and waterways, $44,000; other public works, $73,000; industrial buildings, $93,000; other buildings, $344,000.

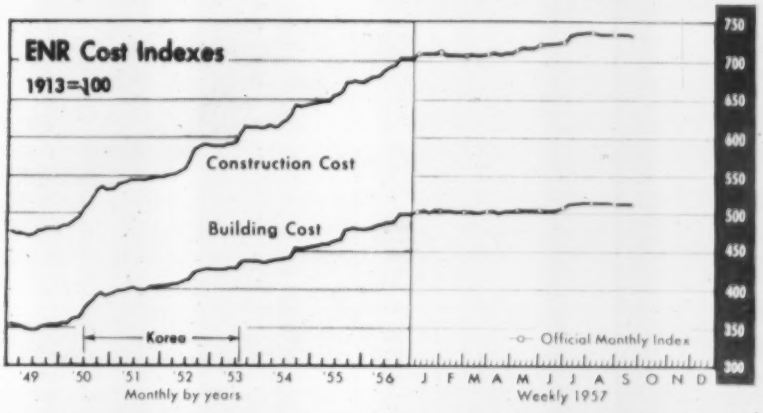
NEW CAPITAL FOR CONSTRUCTION

	Week of Sept. 19	Cum. 38 wks 1957	Chge '56-'57
	millions		%
Corporate Securities	$125.0	$4,259.1	+15
State and Municipal:			
All Except Housing	121.8	3,995.3	+21
Housing		155.8	+268
Federal Loans	1.1	167.3	+33
Federal Aid		2,161.2	+102
Total Nonfederal	$247.9	$10,738.8	+30
Federal Appropriations:			
In U. S.		$2,777.0	−20
Outside U. S.		29.0	+82
Total New Capital	$247.9	$13,544.7	+16

Cost Indexes as of Now

ENR INDEXES (1913=100), 20-cities' average	Week of Sept. 19 1957	% Change from Aug. 22 1957	% Change from Sept. 20 1956
Construction Cost	737.36	−0.1	+4.8
Building Cost	516.32	−0.01	+3.4

To convert above indexes to 1926=100: Divide Construction Cost by 2.080; Building Cost by 1.850
1949=100: Divide Construction Cost by 1.770; Building Cost by 3.518



BACKLOG OF PROPOSED HEAVY CONSTRUCTION

	Aug. 31 1957 (millions)	Percent Change from last Month	Year
Total U. S. (ENR reported)	$108,664	+1.7	+6.8
By Ownership—			
Private	45,972	+1.3	+6.1
State and Municipal	49,667	+2.7	+10.9
Federal	13,025	−0.7	−3.7
By Type of Work—			
Waterworks	2,323	+1.5	+11.2
Sewerage	3,297	+0.5	+6.3
Bridges	3,280	+6.0	+13.3
Highways	12,811	−0.5	+9.1
Earthwork, Waterways	12,004	+7.8	+6.5
Public Buildings	19,849	+0.8	+9.7
Industrial Buildings	16,444	+0.7	+2.7
Commercial Buildings	19,789	+1.2	+10.9
Unclassified, Private	9,738*	+2.6	+2.7
Unclassified, Public	9,127	+0.2	−0.5

* Includes private bridges, $86 million

FLOW OF NEW PROJECTS INTO THE BACKLOG

	1957 Aug.	1957 8-months	Percent Change from '56 Aug.	Year Cum.
	(millions)			
Total U. S. (ENR reported)	$2,894	$13,978	+34.4	−18.5
By Ownership—				
Private	1,045	6,439	+25.9	−28.3
State and Municipal	1,830	6,978	+223.9	+1.5
Federal	19	562	−99.5	−64.2
By Type of Work—				
Waterworks	56	304	+33.2	+8.5
Sewerage	46	410	−9.0	+19.3
Bridges	208	480	+946.1	+47.5
Highways	108	1,721	−40.4	+69.9
Earthwork, Waterways	945	1,062	+1,854.5	+105.9
Public Buildings	401	2,967	+17.3	−8.4
Industrial Buildings	315	2,199	−0.3	−45.8
Commercial: Mass Housing	198	1,621	−16.9	−30.2
Other Building	225	1,838	−7.4	+0.9
Unclassified, Private	307	780	+340.7	+4.1
Unclassified, Public	84	599	−86.8	−75.4

FLOW OF PROJECTS OUT OF BACKLOG INTO CONTRACTS

Total U. S. (ENR reported)	946	6,685	+23.7	−3.5
By Ownership—				
Private	372	2,477	−9.3	−34.8
State and Municipal	462	3,178	+44.1	+27.7
Federal	112	1,030	+232.0	+62.0

THE LONGER LOOK:

Research Sets Up Capital Goods Boom

Signs that the capital goods boom which began in 1955 is leveling off (ENR Sept. 12, p. 142) lead naturally to the question: When can we look for another spurt in industrial buildings?

A recent study by the McGraw-Hill Department of Economics indicates that even now industry is laying the groundwork for the biggest capital goods boom in history. It is doing so through rapidly increasing research to develop new products and new processes. This will lead to rising sales of new products—then to a need for new capacity to turn out these products in volume and to utilize the new processes.

The timetable cannot be set down exactly. But the McGraw-Hill study points to the early 1960s as the years when current research programs will begin to pay off in new product sales, with the mid-1960s as the time for a jump in capital spending for new capacity to make these products.

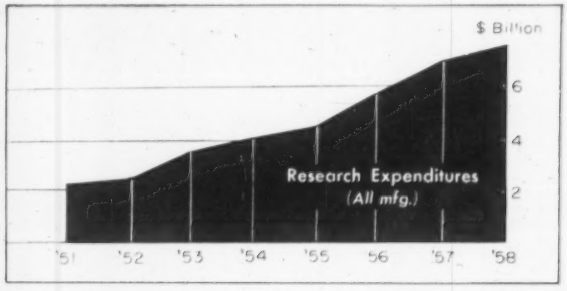
This timetable is based on two observations about the relation between research, new products and capital expenditures:

- There is an average lag of at least seven years from the start of research on the new product until it is ready for large-scale output. A survey of company research directors showed that the usual time-lag from start of research to introduction of new product is four to six years. Output at first is generally small, and it may be another two years before a large plant is built.
- Most industries have begun to make heavy outlays for research only in the last three years. From 1954 to 1956 research expenditures in manufacturing increased over 40%, and another 20% increase is occurring this year.

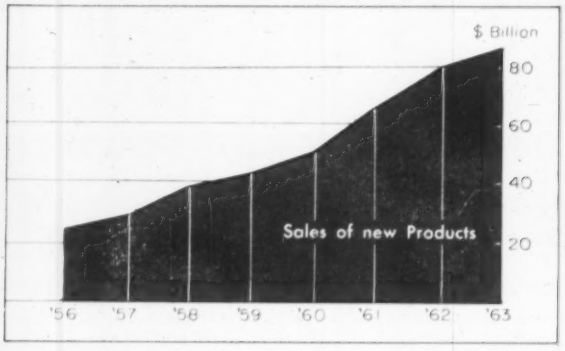
Industry put relatively small amounts into research before 1950. Then the Korean war brought government contracts for research in aviation, electronics and related fields. Results of this upsurge are becoming apparent now in 1957 in the production of improved military aircraft, including the first guided missiles.

On the civilian side only a few industries, like the chemical and electrical industries, went in much for research before 1954 or 1955. More liberal tax treatment of research outlays in 1954 helped. But also business was getting more competitive, and new products were needed to spark sales.

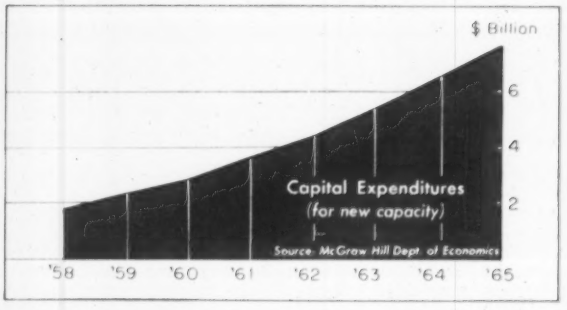
Research expenditures in manufacturing are rising fast . . .



After 5 years for commercial development, this pays off in new product sales . . .



After 2 more years for building markets, industry needs to spend for new capacity.



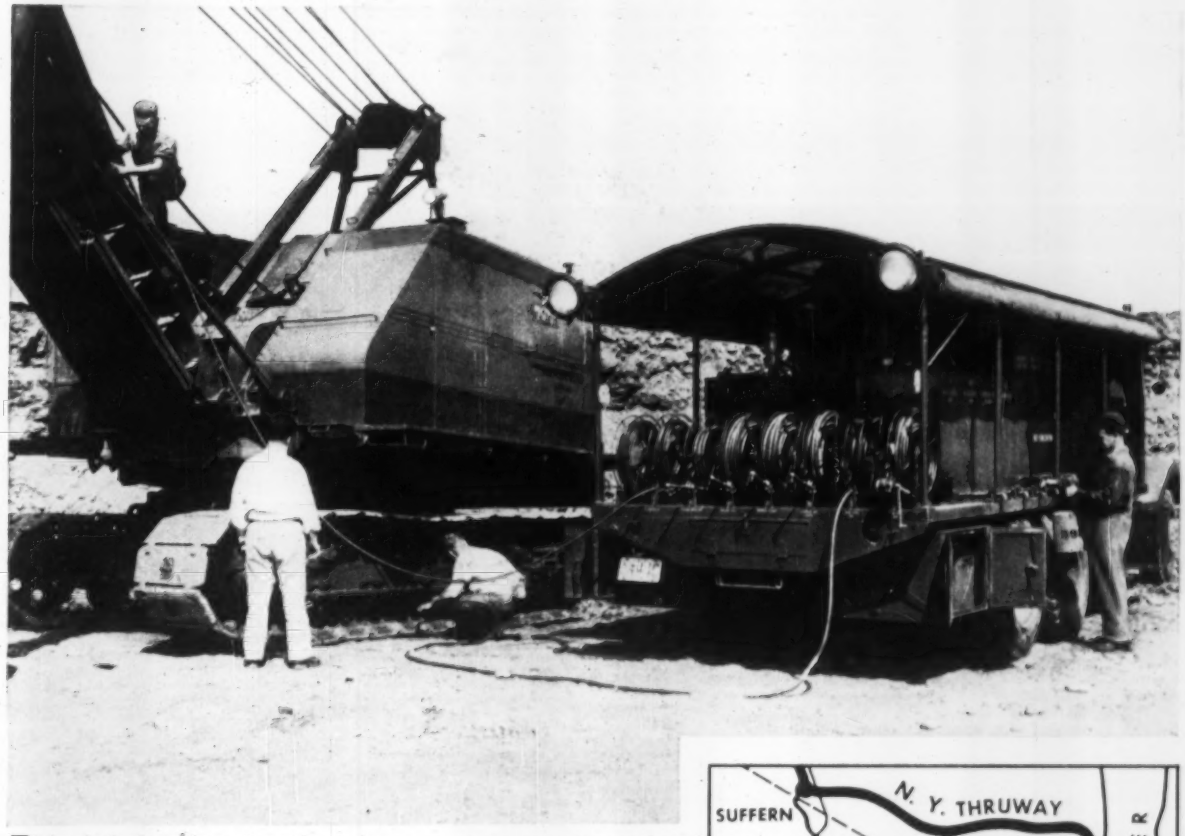
Some results of the upswing in research on consumer products are already becoming evident, as industry plans to introduce more new products in 1957-60 than in any previous four year period. But, considering the seven year lag between research and needs for new plants, it will be 1962-63 before the research expansion of 1955-56 is a dominant factor in capital expenditures.

Once the flow of new products starts, however, it will accelerate sharply—for research has been picking up steam. On top of this year's 20% increase in research outlays, manufacturing companies are planning to boost research spending another 27% by 1960. So it seems clear that the effects of research on plant expenditures will increase well into the middle or late 1960s.

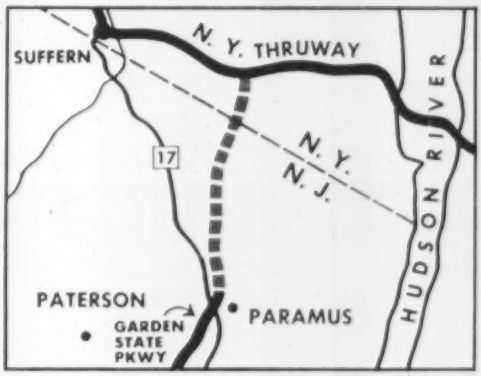
This forecast of a spurt in new product sales in the 1960s squares with predictions of expanding markets on another basis. Population experts are forecasting another upsurge in marriages and births around 1965, so industry will have to get ready for growing markets. And this expansion will include many new products and new processes.

Here are a few suggestions, developed in the McGraw-Hill study, as to how the impact of research programs will show up over the next decade:

(Continued on page 99)



This lubricating truck was designed and built by Brewster for high-pressure on-the-site lubrication and fueling of equipment.



A vital link between New Jersey's Garden State Parkway and the New York Thruway is being built by Geo. M. Brewster & Son, Inc. It's a 4-lane 3½-mile highway.

Geo. M. Brewster & Son, Inc.

relies on ESSOLUBE HD for cleaner engines, greater power, longer life

Essolube HD was specified for Brewster's 85 pieces of construction equipment used on the Spring Valley-Paramus Connecting Link job. (In their new Caterpillar supercharged diesels, Brewster uses Esso Estor D-3.) Brewster noted *outstanding internal cleanliness resulting in better engine efficiency and economy, prolonged engine life.*

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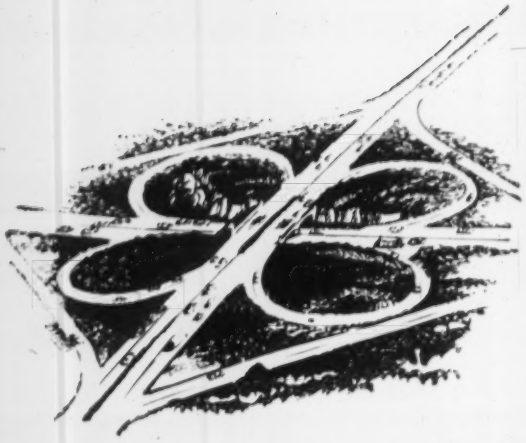

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3,000 lbs. — 5,000 lbs.
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RICHMOND BAR SUPPORTS
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for hanging and screeding concrete decks

RICHMOND DOWEL SUPPORTS
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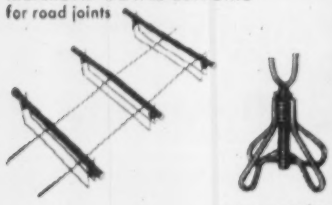
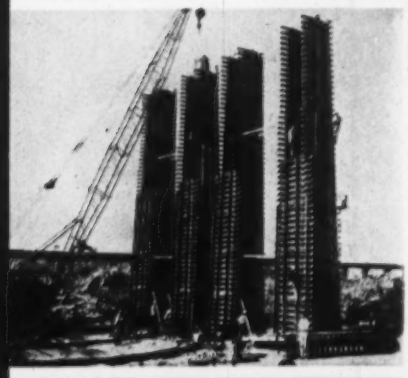
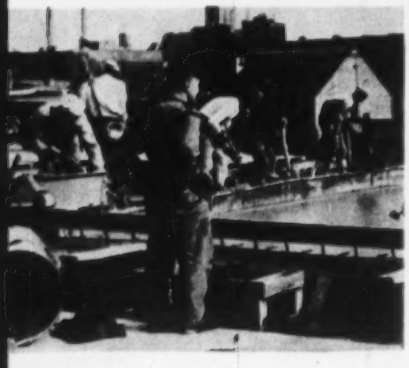


RICHMOND
ADJUSTABLE SCREED CHAIRS
for screeding deck slabs





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(Continued from page 96)

• **New materials**—During the next few years we can expect an increasing flow of new materials, especially plastics and other chemical materials. There also will be new metallic alloys and combinations of metals with plastics or ceramics. Many of these will be adaptable to use in construction.

• **Consumer goods**—There will be a continuing stream of small improvements in consumer goods and great efforts to magnify these by advertising in the next few years. But the really basic changes—all-plastic houses, turbine auto engines, personal helicopters and paper wearing apparel—are not coming until the mid-1960s.

• **Capital goods**—By 1959 or 1960 there should be a significant increase in capital spending for new machines and improved versions of older machines. Application of specialized computers to industrial control problems is one example of an idea now being used in spots is destined for widespread application in the next five years.

• **New processes**—Introduction of new processes is usually too costly for regular replacement programs or small expansions, but several industries are hoping to have new processes ready for the next great round of expansion. Some of these processes are so radical that they will require years of testing before adoption, but they may well be ready by 1965.

The auto industry, for instance, hopes to have the truly automatic factory in being for mass production of the turbine engine. The steel industry is counting on continuous casting for the expansion of the mid-1960s. The electric power industry hopes that a substantial number of its plants can be atom-fueled by then. And the building industry is looking forward to much wider use of prefabrication techniques.

It is this period of the mid-1960s that holds the promise of an unprecedented boom for construction. By then we should have the impact of both new products and new processes, meeting the needs of an expanding market.

New England Thruway Costs Show 7.2% Drop

A 7.2% drop in construction costs on the New England section of the New York Thruway was reported by David J. Martin, acting chairman of the Thruway Authority. Revised figures on the almost completed 15 mile section place the cost at $91.6 million, compared to 1954 cost estimate of $98.7 million. The original estimate excluded toll and maintenance facilities, but the new figures include them.

Merger Could Up Steel Supply

Bethlehem and Youngstown Steel say merger would boost shapes and plate supply in mid-continent area

Millions of dollars of new investment and millions of tons of new steel capacity—a great deal of it in heavy structural shapes and plate—are at stake in the proposed merger of two steel giants, Bethlehem Steel Corp. and Youngstown Sheet & Tube Co.

That's the approach taken by the two steel companies before New York Federal Judge Edward Weinfeld, in a pending government antitrust case designed to block the merger. Bethlehem and Youngstown emphasize that their planned expansion of capacity for structurals and plate now in short supply in the mid-continent area—particularly in and around Chicago—depends on accomplishment of the merger.

The companies spelled out these expansion plans in documents filed in Federal District Court in New York, opposing the government's motion that the judge rule—without a trial—that the merger will violate the Clayton Act's ban on anti-competitive mergers. The plans call for an outlay of about $358 million by Bethlehem to expand existing Youngstown steel-making capacity by 2,588,000 ingot tons annually and to increase Youngstown capacity for finished products by over 2 million tons.

• **Detailed proposals**—Bethlehem would spend about $268 million in Chicago for adding almost 2 million ingot tons of capacity at the Youngstown Indian Harbor plant and to build new finishing mills for structurals and plate. At Youngstown's Youngstown, Ohio plant, Bethlehem would spend about $90 million for 600,000 tons of new ingot capacity and capacity for hot rolled and cold rolled sheets.

Here are the major expansions in finishing capacities that would be added at Youngstown's Chicago plant: (1) 456,000 tons for sheared plate, (2) 540,000 tons for wide-flange structural shapes, and (3) 180,000 tons for standard heavy structural shapes.

In defending the proposed merger, Bethlehem President Arthur B. Homer says the greatest growth in demand for steel products in the next 15 to 20 years will take place in the mid-continent area—particularly in and around Chicago. Demand in the area has long exceeded the capacity of plants located there, and the opening of the St. Lawrence Seaway is expected to increase demand materially. And the products in shortest supply in the region are heavy structural shapes and plate—products in which Bethlehem has wide production experience.

• **New structural source**—But Bethlehem has no plants in the mid-continent area and Youngstown does not produce heavy structurals and plate. Only U. S. Steel Corp. produces a complete range of sizes of these products in the mid-continent area—It has 55.7% of the industry capacity for structural shapes in that region; Inland Steel Co. has 24.9%.

In effect, Bethlehem wants to enter this market by acquiring Youngstown's plants already in existence there. Bethlehem argues it cannot effectively compete in the mid-continent area from its existing plants in the East and West because of freight disadvantages. Furthermore, neither Bethlehem nor Youngstown can alone provide the expansion planned.

According to the companies, the planned expansion of Youngstown's existing facilities will cost the merged companies about $135 a ton—a cost the companies say they can carry out within the present price structure of the industry and within their available financial resources if merged.

Alone, however, the companies say the proposed expansion cannot be undertaken. Bethlehem says it cannot afford to build the same facilities from the ground up. New facilities equal to the planned expansion plus Youngstown's existing plants would cost an estimated $300 per ingot ton and would double Bethlehem's entire asset investments. Youngstown, even though it could expand its own facilities cheaper than Bethlehem could build new facilities, says the proposed expansion is "impossible" for it to finance alone.

Government antitrust officials point out, however, that expansion by merger is not the only way the steel industry can grow. Actually, the proposed plans for expansion announced by the two companies, if the merger goes through, represent about a 40% reduction in the amount of new capacity Bethlehem has indicated earlier it would add at the Youngstown, Ohio, plant. The reduction represents expansions of existing ingot capacity at Youngstown by Youngstown since the merger agreement was signed in 1956.

• **The primary issue**—The first issue to be decided by Judge Weinfeld is

whether he can rule on the merger solely on the basis of the government's economic affidavit submitted in June, or whether he must have a trial, additional evidence and argument on all the issues, as the two steel companies contend.

A large part of the affidavits submitted last week by companies are on this point. Four economists presented by the companies, who studied both the companies' and the government's side of the case, agree that the government's affidavit—backing up its request for a decision without a trial—does not by itself provide enough facts for a court to say the merger would violate the law.

So, the documents submitted last week are in preparation for the next step in the litigation.

The legal briefs and arguments are to be submitted by the government on October 15 and by the companies on October 25. Judge Weinfeld will then hear oral arguments on the government's request for a summary ruling on November 4. Under this schedule, Judge Weinfeld could rule on this motion by the end of the year. If he grants it—in effect, declaring the merger illegal—the companies would immediately appeal to the Supreme Court. If the government loses in either court, a trial would then have to be held.

• **Company arguments**—Here are the principal arguments made by the companies in support of the merger:

• Bethlehem and Youngstown complement rather than compete with each other. Each sells the bulk of its products in its own natural markets—Bethlehem in the East and West, and Youngstown in the mid-continent area.

• Even after the merger, the new company would have sizable competition from the rest of industry. Competing steel makers are and still would be predominant in all the products both Bethlehem and Youngstown manufacture.

• Far from reducing competition, the merger would actually increase it: By creating for the first time a nationwide competitor for the industry giant, U. S. Steel Corp.; and by creating more effective competition against six other major steel producers in Ohio, Illinois, Indiana, Michigan and Wisconsin, a market that's difficult for Bethlehem to tap.

• **Government arguments**—The government, on the other hand, argues the merger would violate the law because:

• The natural market concept does not hold up: The companies do compete in the same geographic areas, sell into each other's "natural markets," and often sell the same products in the same states even to the same customers.

• The companies' share of products is significant in the industry's totals. A merger of the two would increase concentration and Bethlehem's rank both nationally and in important regional markets—particularly a 15-state "northeastern area" and a five-state "Chicago area."

• The most significant competitive impact of the merger will be on smaller steel companies—not U. S. Steel—and could be the spark to touch off a whole round of mergers in the steel industry. Only creating a stronger, bigger Number Two in the industry—Bethlehem already is Number Two—to compete against U. S. Steel is little excuse for further concentrating steel production, especially when Bethlehem already outranks U. S. Steel in certain important products in important consuming areas.

Miami-Fort Pierce Turnpike May Be Extended 100 Miles

The Florida Turnpike Authority intends to extend the 110 mile Miami-Fort Pierce tollroad another 100 miles northward to Orlando if the project is found to be financially feasible and the bonds can be sold. The turnpike engineers—Howard, Needles, Tammen & Bergendoff—estimate that the Fort Pierce-Orlando leg can be built for $70 to $75 million.

In 1955 the state legislature granted the authority the right to extend the turnpike from Fort Pierce to Tisonia (north of Jacksonville) at an estimated cost of $185 million. The tight money market has prevented sale of securities for the entire project but, according to State Attorney Richard Irvin, piecemeal construction is not prohibited under the legislative authority.

Size of Seaway Port Project Is Slashed Almost in Half

The proposed Seaway port project for Detroit has been reduced appreciably in size by the port committee of the County Board of Supervisors.

The original project planned by the Port Commission included berths for four ocean-going vessels, three transit storage sheds, and would have covered 1,977 ft of waterfront. As now planned, the installation will have only two berths, two transit storage sheds and a waterfront length of 1,105 ft.

Cost of the original project had been estimated at $13.5 million. The new plan reduces this to about $9.4 million.

New Research Center Nears Bid Stage

Procter & Gamble Co. will construct a new technical and research center on a 265 acre tract on the outskirts of Cincinnati, Ohio. Bids will be called early next year for site development and foundation work for an initial group of four buildings having an estimated cost of approximately $7 million.

The site is about two miles from the company's present production, research and administration facility. During the next 10 years, eight additional structures are planned on the new tract.

None of the first four buildings will be for manufacturing, but will contain laboratories, offices, food testing areas, service and utilities, and storage.

The largest structure will be 200 x 200 ft and will have three stories. Another building of two stories will be 200 x 150 ft. The personnel and central foods handling structure will have two and three stories and measure 200 x 100 ft. The smallest structure of two stories will be 100 x 100 ft.

The campus-style layout of the buildings calls for locating them on a series of terraces to take advantage of the site.

Except for a small section of the service and utilities building, all will be of reinforced concrete construction with curtain walls of porcelain enamel.

Schmidt, Garden & Erikson of Chicago are the architects.

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Joint Board Seeks NLRB Aid

Lathers, Joint Board and contractor groups discuss jurisdictional disputes procedure with labor board

The National Labor Relations Board was urged last week to give employers in the construction industry—and the general public—unequivocal assurance that it has the power to prevent, and will prevent, construction workers from striking in protest against work assignments.

Now squarely facing for the first time a complex legal problem that vitally affects the construction industry's National Joint Board for the Settlement of Jurisdictional Disputes, the NLRB heard oral arguments Sept. 19 in a case that stemmed from a carpenter-lather dispute over acoustical ceiling work in Cleveland. Groups represented at the hearing were the lathers' international union and their Local 2, General Counsel for the NLRB, the Joint Board, Acoustical Contractors Association of New York and the Building Trades Employers Association of Long Island.

Crucial issue is whether the existence of the Joint Board legally restricts the power of the NLRB to prevent work stoppages in jurisdictional disputes.

Taking a broad view of the problem, the Joint Board argued that the ultimate goal is elimination of jurisdictional work stoppages and that Congress intended the goal be achieved voluntarily by the industry insofar as possible. To this end, it said, the Taft-Hartley Act contemplates that the Joint Board shall handle disputes among parties who have subscribed to its procedure, and that the role of the NLRB shall be restricted to obtaining injunctions against strikes and to preventing recalcitrant unions from engaging in the unfair labor practice of striking to win a disputed assignment of work.

The lathers argued, on the other hand, that the activities of the Joint Board and the NLRB cannot be integrated as the Joint Board contends. Asserting that the Joint Board procedure is no longer a voluntary process, they claimed the right to have their disputes fully processed by the NLRB, even to the extent of a resolution of the disputes on their merits. In the alternative, they argued that if the Joint Board is the voluntary machinery Congress contemplated, then the NLRB is ousted of jurisdiction and can neither rule on disputes nor ban strikes under its unfair labor practice procedure. The latter would effectively prevent the NLRB from serving as an enforcement agency for the Joint Board, which has no enforcement machinery of its own.

Contractor representatives at the hearing generally subscribed to the aims and purposes of the Joint Board but urged a realistic approach to the problem. In substance, they said the NLRB should exercise the full measure of its jurisdiction to prevent work stoppages, even if it means overriding the Joint Board, whose fate, they argued, is secondary to the primary objective.

The troublesome sections of the Taft-Hartley Act that the pending NLRB decision is expected to clarify are 8(b)(4)(d) and 10(k) and (l), together with NLRB regulations 102.71 and 102.72.

Union Contract Signed With Engineering Firms

Operating engineers Local 3 in San Francisco has signed a one year contract, retroactive to Aug. 1, with three associations of civil engineers and land surveyors and 20 independent firms in the San Francisco Bay area. Agreement calls for an across-the-board wage increase of 16 cents an hour.

For the first time, provision is made for paid holidays, and the method of determining vacation pay is revised. Vacation pay—up to a total of two weeks annually—will now accrue at the rate of 4% of gross pay.

Minimum rates for the local's 700 members under the new agreement range from $2.61 an hour for rear chainmen to $3.51 for chief of party.

Building Trades Protest Association Bargaining

In a protest against association bargaining, the Montreal Building Trades Council called a strike this month at a 17 story building under construction for Northern Electric Co. in Montreal.

Purpose of the strike, according to a council spokesman, is to force contractors who now negotiate collectively through the Montreal Builders' Exchange, to negotiate individually with the unions. In such negotiations, the trades would seek a union shop clause.

Unions that complied with the strike call included electricians, plumbers, sheet metal workers, hoisting engineers and elevator operators. Carpenters and nonunion workers refused to participate. The council reported the strike 60% effective; a representative of the general contractor, Louis Donolo, said the strike looked like part of a membership drive and that pickets established by the council had not affected the work to any great extent.

The Montreal Builders' Exchange, which challenged the picketing as illegal, has asked the Quebec Labor Minister to intervene. Unions have opposed the intervention as long as the challenge of illegality remains.

Present contract with the Builders' Exchange, which has been negotiating for management for 30 years, is a 2-year agreement expiring Mar. 28, 1959.

Union spokesmen said similar protests of an "informative" nature would be directed at other members of the association.

Court Bans Highway Clash Between AFL-CIO and UCW

An injunction that forbids members of the AFL-CIO building trades unions from picketing Kentucky's first interstate highway project has been continued indefinitely.

The picketing began when Saltsman Construction Co. was accused of refusing to hire AFL-CIO members and of hiring members of United Construction Workers, instead. Saltsman is the contractor on two bridges over the Nolin River near Elizabethtown. It has a labor contract with UCW, a division of the United Mine Workers' District Fifty. A temporary restraining order against picketing of the project was issued by Hardin County Court on Aug. 9.

An unfair labor practice charge against the contractor has been filed with the National Labor Relations Board by one of the AFL-CIO unions. Saltsman attorneys claim, however, that the AFL-CIO unions are attempting to force the contractor to break its contract with UCW.

The AFL-CIO unions plan to appeal the injunction on jurisdictional grounds. They claim the project is in interstate commerce and that the NLRB and not the state courts have jurisdiction. Saltsman contends the work does not involve interstate commerce and that the dispute is not within the jurisdiction of the NLRB.

The question of labor law jurisdiction has frequently created a "no-man's land" that has long plagued the industry.

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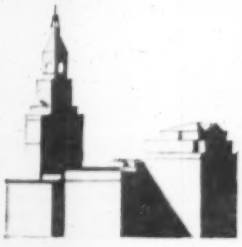

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New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A.M., advanced standard time, which is nine-thirty o'clock A. M., eastern standard time, on the 10th day of October 1957, by Henry A. Cohen, Director, Bureau of Contracts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 3, Wm. Robinson, District Engineer, 333 E. Washington St., Syracuse, N. Y.						
Onondaga	PSC 17627	Elimination of Grade Crossing of the N.Y.C.R.R. with Main St., Village of Minoa and Synder Rd., Town of Manlius	0.92 (0.44) (Acc.)	9" Cem. Conc. Pavt. 24', 40' Wide = 0.86 mi. Asph. Conc. = 0.37 mi. Misc. Work = 0.13 mi. RR Sep. Comp. I-Beam 185' Br. Prestressed Conc. 118.5' Extend Exist. Pedestrian Overpass	$55,000 Plans $15	$1,002,000
DISTRICT No. 5, E. G. H. Youngmann, District Engineer, 65 Court St., Buffalo 2, N. Y.						
Chautauqua (Rte. 17)	FARC 57-53	Falconer Village, S.H. 5067 Falconer-Kennedy, S.H. 698 Proj. F-449(7)	1.21	9" Cem. Conc. Pavt. 48' Var. Wide = 1.01 mi. Asph. Conc. = 0.19 mi. Misc. Work = 0.01 mi. Comp. I-Beam Br. 160'	$50,000 Plans $15	$878,000
Erie (Rte. 5)	FAC 57-13 FAC 57-14	City of Lackawanna: Arterial Route, Fuhrmann Blvd.-Hamburg Tpke. Viaduct (Ridge Rd.-North City Line) Cont. 4 City of Buffalo: Arterial Route, Fuhrmann Blvd.-Hamburg Tpke. Viaduct (South City Line-Tifft St.) Cont. 4 Proj. U-750(12)	1.10 (2.68) (Acc.)	Viaduct Substructure = 0.56 mi. Asph. Conc. Ty. 2A = 1.41 mi. Grading with Gravel Surface = 1.27 mi. Grading with Stone or Slag Surface = 0.22 Misc. Work = 0.32 mi.	$215,000 Plans $50	$3,894,000
Erie	C 57-17	City of Buffalo: Fuhrmann Blvd. High Level Bridge	1.20	Beam Type Curb Barrier = 1.10 mi. Misc. Work = 0.10 mi.	$3,000 Plans $10	$57,000
Niagara	FAC 57-15	City of Niagara Falls: Arterial Route Walnut Ave. & Ferry Ave. (Main St. to Pine Ave. and Packard Rd.) Proj. U-5009)	4.35	Asph. Conc. = 4.22 mi. Misc. Work = 0.13 mi. Pre-Stressed Conc. Br. 76'	$80,000 Plans $25	$1,435,000
DISTRICT No. 7, R. W. Sweet, District Engineer, 444 Van Duzee St., Watertown, N.Y.						
St. Lawrence, N.Y. and Grenville, Ontario., Canada	OBA 57-3	Ogdensburg Bridge. Cont. No. 3	....	Superstructure for 2150' Suspension Bridge	$350,000 Plans $15	$6,000,000
St. Lawrence (Rte. 37)	FAC 57-16 FASH 57-19 FARC 57-171	City of Ogdensburg: Rte. 37, Arterial, City of Ogdensburg: Rte. 37 Connection: Ogdensburg-Morristown, Pt. 1, S.H. 878; Ogdensburg-Waddington, Pt. 1, S.H. 5497 and Ogdensburg-Waddington, S.H. 9357 Proj. U-UG-650(7)	6.87	Asph. Conc. = 6.87 mi. 1 RR Sep. Comp. I-Beam 544.5' 1 RR Sep. Cont. I-Beam 172.28' 1 Hwy. Sep. Comp. I-Beam 151.66' 1 R.C. Open Box Bridge 23.4'	$195,000 Plans $100	$3,570,000
DISTRICT No. 8, K. G. Ratch, District Engineer, Pleasant Valley Road, Poughkeepsie, N. Y.						
Columbia, Putnam, Orange & Rockland	R.C. 57-169	Br. No. 1, S.H. 1033; Br. No. B-1, S.H. 121; Br. No. 1, S.H. 153; Br. No. B-2, S.H. 153; Br. No. B-1, S.H. 449; Br. No. B-1, S.H. 5297, and Br. No. 1, S.H. 8049A	....	Cleaning & Painting 7 Bridges	$500 Plans $10	$10,000
Rockland & Westchester (Rte. 6)	BMB 57-1	Bear Mountain Bridge	0.47	Asph. Conc. Ty. 4A = 0.45 mi. Cem. Conc. Pavt. = 0.02 mi.	$5,000 Plans in Proposal $5	$84,000
Westchester	SMRP 57-1	Saw Mill River Parkway (Mt. Kisco-Katonah, Pt. 2)	2.03	Roadside Development	$1,000 Plans $10	$60,000
DISTRICT No. 10, M. E. Gocl, District Engineer, 325 W. Main St., Babylon, L. I., N. Y.						
Bronx	FIBE 57-3	Bruckner Expressway (Sect. 1, Cont. 2) Proj. I-C-1086(6)	1.03 (1.14) (Acc.)	9" Cem. Conc. Pavt. (Ramp) = 0.05 mi. Cem. Conc. Deck Traffic Surface (Viaduct) = 1.01 mi. Sheet Asph. Pavt. & Misc. Work = 1.11 mi. 76 Span Comp. Girder & I-Beam Viaduct 5330.1'	$600,000 Plans $100	$16,340,000
Nassau & Suffolk (Rtes. 24, 25, 25A, 27)	RC 57-170	Various Highways in District 10 as Follows: S.H. 545, 9020, 1048A, 1274, 1883, 8181, 8229 & S.H. 52-3, S.H. 52-12	14.64	Landscaping	$3,500 Plans $10	$61,000
Nassau & Suffolk	SSP 57-1	Southern State Parkway (Cont. 14)	4.83	Furnishing & Erecting Aluminum Chain Link Fencing	$6,200 Plans $10	$113,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage) Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

Re: O.B.A. 57-3, St. Lawrence County, N. Y., and Grenville, Ontario, Canada: Maps, plans, specifications and proposals may be seen and obtained at the offices of Dr. P. L. Pratley, 369 Drummond Building, Montreal, Canada; and at Modjeska and Masters, Forster at 6th Street, Harrisburg, Pa.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Laws, as set forth in "Instructions to Bidders".

The right is reserved to reject any or all bids.

JOHN W. JOHNSON
SUPT. OF PUBLIC WORKS

OFFICIAL PROPOSALS

Bids: Oct. 8, 1957.

Power Authority of the State of New York Advertisement for Proposals for the Construction of Relocation of Norwood & St. Lawrence Railroad Facilities Near Waddington St. Lawrence County, New York Specifications No. PA-5-11034 St. Lawrence Contract No. 42

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for Construction of Relocation of Norwood & St. Lawrence Railroad Facilities near Waddington, St. Lawrence County, New York, until 10:30 A.M. Eastern Daylight Saving Time on the 8th day of October, 1957, at the Authority's office, 18th floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place the proposals will be publicly opened and read aloud.

The estimated quantities of the principal items of work are:

Excavation, unclassified	81,000 cu. yds.
Excavation, sand borrow	36,000 cu. yds.
Compacted embankment	40,000 cu. yds.
Uncompacted embankment	80,000 cu. yds.
Sand and gravel for fill under riprap and road material	5,200 cu. yds.
Dumped quarry riprap	3,800 cu. yds.
Gravel and boulder blanket	2,000 cu. yds.
Railroad track laying new, raising existing and removal of abandoned track	16,400 lin. ft.
Reinforced concrete in structures	187 cu. yds.
Furnishing and erecting structural steel	75,000 lbs.
Furnishing and laying 6 inch cast iron water line	1,850 lin. ft.
Furnishing and installing corrugated metal pipe culverts sizes 12, 18, 24, 30 and 36 inch	594 lin. ft.
Relocating railroad depot, buildings and two operating cranes	
Relocating electrical substation and distribution system	

All of the construction work shall be completed on or before October 1, 1958.

Plans, Specifications and Proposal Forms for the work may be obtained from the Power Authority of the State of New York, at the 48th floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, upon application and prepayment of a fee of Ten ($10.00) dollars per initial set of contract documents, and Five ($5.00) dollars per set for additional sets, no part of which will be refunded. Plans, Specifications and Proposal Forms for the work will be on file in the Authority's office and in the offices of the Engineer, Chl. Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and The Hydro-Electric Power Commission of Ontario, 620 University Avenue, Toronto 2, Ontario and may be inspected by prospective bidders during office hours.

Bids must be made in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 20 percent of the gross sum bid.

The right is reserved to reject any or all bids.

W. S. CHAPIN
GENERAL MANAGER

U. S. Government

Bids: Nov. 13, 1957

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4971) will be received at Kanab, Utah until November 13, 1957, for furnishing labor and materials for Administration Building, Dormitory, Police Building, and Garage and Fire Station for Page, Arizona, Glen Canyon Unit, Colorado River Storage Project, Arizona-Utah. Location near Lees Ferry, Arizona. Principal items are 13,000 cu. yds. excavation; 3,450 barrels furnishing and handling cement; constructing administration building; dormitory; police building; garage and fire station building; and other work. Completion time 360 days. For particulars, address Bureau of Reclamation, P. O. Box 360, Salt Lake City, Utah; P. O. Box 267, Kanab, Utah; or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

OFFICIAL PROPOSALS

Bids: October 28, 1957.

City of Willimantic, Connecticut Contract No. 2 Interceptor Sewers Advertisement for Bids

Sealed proposals for the construction of Contract No. 2, Intercepter Sewers, comprising about 5500 feet of 8" and 14" pipe in the North Intercepter and about 5300 feet of 8" and 10" pipe in the South Intercepter, will be received by the City Clerk of Willimantic, Connecticut, at the offices of the City Clerk, Room 3, City Hall, until 1:30 P.M. Eastern Standard Time, Oct. 28, 1957, and immediately following that time will be publicly opened and read aloud in the office of the Board of Aldermen.

Information for Bidders, Bid Form, Schedule, Form of Agreement, Form of Performance Bond, Specifications, Plans and other Contract Documents may be examined at the office of the City Clerk, Willimantic, Connecticut, or at the offices of Gibbs & Hill, Inc., Pennsylvania Station, New York, New York, and copies thereof may be obtained upon deposit of $20.00 for each set. The full deposit will be refunded to each bidder, and one-half the deposit to each nonbidder upon the return of such set in good condition within 10 days after the opening of bids. Checks shall be made payable to Roger F. Paulhus, Treasurer of the City of Willimantic.

Each proposal must be accompanied by a bid bond in an amount not less than five per cent (5%) of the amount of the bid.

The City of Willimantic reserves the right to waive any informalities in or to reject any or all bids.

CITY OF WILLIMANTIC, CONNECTICUT
By Roger F. Paulhus
City Clerk

September 26, 1957.

Bids: Oct. 28, 1957.

City of Willimantic, Connecticut Contract No. 1 Sewage Treatment Facilities Advertisement for Bids

Sealed proposals for the construction of Contract No. 1 comprising Sewage Treatment Facilities and miscellaneous appurtenances for the City of Willimantic will be received by the City Clerk of Willimantic, Connecticut, at the offices of the City Clerk, Room 3, City Hall, until 1:30 P.M. Eastern Standard Time, October 28, 1957, and immediately following that time will be publicly opened and read aloud in the office of the Board of Aldermen.

Information for Bidders, Bid Form, Schedule, Form of Agreement, Form of Performance Bond, Specifications, Plans and other Contract Documents may be examined at the office of the City Clerk, Willimantic, Connecticut, or at the offices of Gibbs & Hill, Inc., Pennsylvania Station, New York, New York, and copies thereof may be obtained upon deposit of $20.00 for each set. The full deposit will be refunded to each bidder, and one-half the deposit to each non-bidder upon the return of such set in good condition within 10 days after the opening of bids. Checks will be made payable to Roger F. Paulhus, Treasurer of the City of Willimantic.

Each proposal must be accompanied by a bid bond in an amount not less than five per cent (5%) of the amount of the bid.

The City of Willimantic reserves the right to waive any informalities in or to reject any or all bids.

CITY OF WILLIMANTIC, CONNECTICUT
By Roger F. Paulhus
City Clerk

September 26, 1957.

Bids: November 2, 1957

Board of Management for the Port of Rangoon Development of Rangoon Port

Civil Engineering Contract No. 2. Transit Sheds, Warehouses and Workshops

The closing date for the above Contract is now 12.0 noon on Saturday, 2nd November, 1957, instead of 28th September, 1957 (as previously notified in the issue of 8th August, 1957).

WIN PE, CHAIRMAN.

OFFICIAL PROPOSALS

Bids: Oct. 10, 1957.

Delaware River Port Authority of the Commonwealth of Pennsylvania and the State of New Jersey Administration Building Camden, New Jersey Walt Whitman Bridge Contract No. 13

Sealed bids will be received for Landscaping and Miscellaneous Work for the Walt Whitman Bridge, known as Contract No. 13, at the office of the Executive Director of the Delaware River Port Authority, Administration Building, Bridge Plaza, Camden, New Jersey, until 2:30 P. M., Eastern Daylight Time; Thursday, October 10, 1957, at which place and time they will publicly opened and read by the Authority.

A more complete description of the work and full information for bidders are given in the Contract Documents and Specifications for this Contract, which may be obtained upon the deposit of $10.00 check, which will be remitted upon receipt of bid or the return in good condition of the copies so taken, within thirty days after the opening of bids.

Each proposal must be accompanied by a certified check in the sum of $10,000 payable to the Delaware River Port Authority and drawn upon a National or State Bank or Trust Company having an office or place of business either in Philadelphia, Pennsylvania or Camden, New Jersey, and must not be enclosed with the sealed bid. The surety's consent must be shown. The bidder to whom the contract is awarded will be required to furnish a Performance and Labor and Materialman's Bond in the sum of 100 percent.

The Authority will afford prospective bidders an opportunity to inspect the site of the Work.

The Authority reserves the right to waive any informalities in the bids received; to reject any or all bids, and to award the contract only to those experienced in this class of work and to the bidder whose proposal is deemed by the Authority to be most advantageous to the public interest.

DELAWARE RIVER PORT AUTHORITY
JOSEPH K. COSTELLO
EXECUTIVE DIRECTOR

U. S. Government

Bids: Oct. 24, 1957.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-4972) will be received at McCook, Nebraska until October 24, 1957, for furnishing labor and materials for earthwork and structures for Meeker Extension canal, Station 1563+15 to Station 2122+17.6, and laterals, wasteways, and drains, Frenchman-Cambridge Division, Missouri River Basin Project, Nebraska. Location near McCook, Nebraska. Principal items are 412,000 cu. yds. excavation; 111,000 cu. yds. compacting embankments; 1,400 cu. yds. concrete in structures; 2,300 lin. ft. corrugated-metal pipe; 13,100 lin. ft. concrete pipe; and other work. Completion time 540 days. For particulars, address Bureau of Reclamation, P. O. Box 737, McCook, Nebraska; or Building 53, Denver Federal Center, Denver 2, Colorado. W. A. Dexheimer, Commissioner.

Read the Official

Proposal Columns of

ENGINEERING NEWS-RECORD

This Week and Every Week

OFFICIAL PROPOSALS

Bids: Oct. 30, 1957.

Triborough Bridge and Tunnel Authority

SEALED BIDS WILL BE RECEIVED BY Triborough Bridge and Tunnel Authority at its office, Administration Building, Randall's Island, Manhattan, New York 35, N. Y., as follows:

Until 11 A. M. on Wednesday, October 30, 1957.

For Throgs Neck Bridge Contract No. TN-4A, Bronx Anchorage Foundation and Superstructure. The bid must be accompanied by a deposit in the amount of $250,000.00.

and

For Throgs Neck Bridge Contract No. TN-4B, Queens Anchorage Foundation and Superstructure. The bid must be accompanied by a deposit in the amount of $300,000.00.

Foundations will be open dredged caissons located in East River, in the City of New York.

Bidders may submit bid for either one or both of the above contracts.

Plans, specifications and contract documents may be purchased at the office of the Authority for $30.00, which will not be refunded.

Bids: Oct. 23, 1957.

Triborough Bridge and Tunnel Authority

SEALED BIDS WILL BE RECEIVED BY Triborough Bridge and Tunnel Authority at its office, Administration Building, Randall's Island, Manhattan, New York 35, N. Y., as follows:

Until 11 A. M. on Wednesday, October 23, 1957.

For Throgs Neck Bridge Contract No. TN-3, Two Tower Piers, Boroughs of Bronx and Queens, in the city of New York.

Piers will be founded on open dredged caissons located in East River.

Each bid must be accompanied by a deposit in the amount of $200,000.00.

Plans, specifications and contract documents may be purchased at the office of the Authority for $30.00 which will not be refunded.

Engineering News-Record

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Its distribution among the contractors of any one state is in proportion to the number of contractors situated in that state. The Official Proposal Columns of *Engineering News-Record* offer precisely the same efficient service to municipalities, counties, state and federal departments in every section of the United States.

OFFICIAL PROPOSALS

Bids: Oct. 14, 1957.

Washington Suburban Sanitary Commission Contract No. 1967-S Sewage Treatment Plant

Sealed proposals for the construction of a sewage treatment plant, near Laurel, Prince George's County, Maryland, including clearing of the site, excavation and grading, the main pumping station, primary clarifiers, recirculation pumping station, sludge digestion tanks and drying beds, electrical work, fencing, roads and walks, seeding and sodding and all other incidental work, will be received at the office of the Secretary of the Washington Suburban Sanitary Commission, 4017 Hamilton Street, Hyattsville, Maryland, until Monday, October 14, 1957 at 12:30 P.M., Eastern Daylight Saving Time, at which place and time they will be publicly opened and read.

Plans, Proposal Form and the Special Provisions for this contract may be obtained from the office of the Chief Engineer of the Commission, upon deposit of $10.00, which deposit will be returned to bidders or to those returning plans and forms in good condition within 10 days after opening of bids.

T. Earle Bourne, Chairman
Frank L. Hewitt, Jr., V-Chairman
J. Norman Ager
James B. Bland
Willard A. Morris
L. S. Ray
Commissioners

Attest:
John T. Bonifant
Secretary

Bids: October 9, 1957

Construction of Sanitary Sewers

Sealed bids will be received until 11:00 A.M., EST, on October 9, 1957, in the office of the City Commission of Fort Lauderdale, Florida, for the construction of sanitary sewers in Area "D" consisting of approximately 28,500 linear feet of gravity sewers, 27,000 linear feet of air and force mains, 5 pneumatic ejector lift stations and appurtenances. This contract to be known as "Contract D", Improvement 1005.

Bidding blanks may be obtained from the office of the City Engineer. Plans, specifications, and contract documents are on file in the office of the City Engineer.

A deposit of $40.00 for plans and specifications, and of $25.00 for each additional set of plans or specifications, will be required. All deposits for plans and specifications will be refunded upon their return in good condition within 10 days of the opening of bids.

A certified check, cashier's check or bank officer's check, for 2% of the total amount of the bid, made payable to City of Fort Lauderdale, Florida, shall accompany each proposal as evidence of good faith and responsibility of the bidder. This check shall be retained by the payee as liquidated damages should the bidder refuse or fail to enter into a contract with the payee for the execution of the work embraced in the proposal, in the event the proposal of the bidder is accepted.

The City Commission reserves the right to reject any or all bids.

W. J. Veeder
City Manager

U. S. Government

Bids: Nov. 15, 1957.

ADVERTISEMENT

Sealed bids will be received in the office of the Engineering and Construction Director, Panama Canal Company, Balboa Heights, Canal Zone, until 1 P. M. November 15, 1957 and at that time publicly opened, for the material and work required to furnish and install a coordinated system of remote supervisory control, telemetering equipment, protective relaying equipment, and other appurtenant material for the Canal Zone power facilities. Plans and specifications are available for examination in the office of Chief, Procurement Division, Panama Canal Co., 21 West St., New York 6, N. Y. Data may be obtained upon payment of $50.00 deposit which will be refunded when data is returned within 10 calendar days after bid opening. For further information contact this office, Desk No. 1, or telephone Bowling Green 9-5586, extension 56.

OFFICIAL PROPOSALS

Bids: October 17, 1957

Power Authority of the State of New York Niagara Power Project

ADVERTISEMENT FOR PROPOSALS
FOR
THE FURNISHING AND DELIVERY
OF
37,500 HP/25,000 KVA MOTOR/GENERATORS FOR
TUSCARORA POWER PLANT
SPECIFICATIONS NO. PA-N-25001
NIAGARA CONTRACT NO. NP2

NOTICE TO CONTRACTORS: The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the furnishing and delivery thereof f.o.b. Model City, New York of 37,500 HP/25,000 KVA Motor/Generators for the Tuscarora Power Plant in Lewiston, Niagara County, New York, until 10:30 A.M. Eastern Daylight Saving Time on the 17th day of October, 1957, at the Authority's Office, 18th Floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place proposals will be publicly opened and read aloud.

Bids will be received for 12 or 6 motor/generators and associated equipment in accordance with the bidding schedules.

Delivery of generator parts will be required beginning on or before August 1, 1959.

Bids will not be restricted to American manufacturers.

Plans, Specifications and Proposal Forms for the work, may be obtained from the Power Authority of the State of New York, at 18th Floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York upon application and prepayment of a fee of Ten ($10.00) dollars per initial set of contract documents, and Five ($5.00) dollars per set for additional sets, no part of which will be refunded. Plans, Specifications and Proposal Forms for the work will be on file in the Authority's Office and in the offices of the Engineer, Chl. Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and may be inspected by prospective bidders during office hours.

Bids must be made in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 20 percent of the maximum price bid for any bid schedule.

The right is reserved to reject any or all bids.

W. S. CHAPIN
GENERAL MANAGER

PA-N-25001

U. S. Government

United States Department of Commerce, Bureau of Public Roads, September 12, 1957. SEALED BIDS will be received at the office of the Inter-American Highway Office, Bureau of Public Roads, Room 602, General Services Building, Washington 25, D. C., until 2:00 p.m., e.d.t., October 15, 1957, for construction of Rama Road Project R-3 in the Republic of Nicaragua. The project begins at the Espabel River about 34 miles east of Santo Tomas and extends easterly toward Rama for approximately 15 miles. Bidders will be limited to United States or Nicaragua firms with a satisfactory record of performance on highway construction in the United States of America or in the Republic of Nicaragua. The approximate quantities of the major items of work are: 95 Hectares Clearing and Grubbing 942,000 cubic meters Unclassified Excavation, 76,800 cubic meters Special Subbase, 2000 cubic yards Cement Rubble Masonry in Headwalls and Retaining Walls, 8,200 linear feet Nestable Bituminous Coated Corrugated Metal Culvert Pipe (from 24" to 72"), 1,400 linear feet Bituminous Coated Structural Plate Pipe (from 84" to 144"). Special conditions of work performed by U. S. Government in foreign areas apply as well as local laws. Plans, Specifications and Proposal Forms are available upon request at the address given above, or at the Inter-American Highway District Office, Bureau of Public Roads, 263 Carlos Palazio Bldg. Calle 5a. Managua, Nicaragua, C. D. Curtiss, Commissioner.

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P. O. Box 12, N. Y. 36. October 10th issue closes September 30th

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CHICAGO: 520 N. Michigan Ave. (11)
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POSITIONS VACANT

Engineers for municipal and industrial water supply, sewerage and treatment projects. Opportunities for permanent connection with long established firm of consulting engineers in mid-west. Both E.I.T.'s and engineers considered. Full information and references in first letter requested. P-5889, Engineering News-Record.

Inspectors—Concrete, Soils & Asphalt. Field, Lab., & Plant. Also Material Engineer & Party Chiefs. Overseas Airbase. Mild Climate. P-6033, Engineering News-Record.

Excellent opportunity with small Engineering Firm in Middle West for Graduate Engineer capable of doing Structural Design, with or without experience. Send age, resume of education and experience, also references and salary expected, time available. P-6000, Engineering News-Record.

Wanted by New Mexico General Contractor! Experienced estimator capable of eventually assuming Chief Estimator's duties. College Education preferred but not required. P-6071, Engineering News-Record.

Wanted—Engineer experienced in design of Water Filtration Plants. State experience, education, salary requirements and when can report. P-6054, Engineering News-Record.

Wanted Construction Engr., Supt., age 25 to 35 for permanent position with small fast growing Constr. Co. Gulf Coast area. Experience in heavy constr. essential. Send resume, ref. & salary required. P-6078, Engineering News-Record.

Established heavy contractor, water mains, sewers, treatment plants in New York State, has opening for alert younger engineer with proven background in field and office, for responsible charge of take off, purchasing, expediting, liaison etc. in main office. In return for interest, sound experience, performance, hard work & hustle we offer only well compensated opportunity to advance with growing organization. P-5918, Engineering News-Record.

Resident Engineer Inspector with experience on disposal plant construction. Write direct to Hill & Hill Engineers, 8 Gibson Street, North East, Pennsylvania.

This firm is in need of Analysts, Estimators, Apprentices and Statistical Typists. Also local sales Representatives. Male or Female. Construction Survey Co., 101 Park Avenue, New York 17, N. Y.

Civil Engineer with sanitary engineering experience or education wanted by Consulting Engineering Firm. Write P-5867, Engineering News-Record.

Wanted—Experienced Bridge Foreman for position with expanding Michigan contractor. Applicant must be able to handle men and organize work on bridge construction. Write, stating experience, age, and references, plus expected beginning salary: Canonie Construction Co., South Haven, Mich.

Engineer and estimator for the main office of a well known engineering and contracting organization in Central Penna. Should have the equivalent of a four year college course in Civil or Architectural Engineering. Give full details of qualifications in letter of application. P-6101

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EXPERIENCED STRUCTURAL STEEL DETAILERS AND CHECKERS
on Buildings and Conveyors. Good working conditions, vacation and bonus plan, liberal insurance benefits. Work in our Cleveland or Toledo office. Send complete resume of experience and qualifications to:

SAMBORN, STEKETEE AND ASSOCIATES, J. H. V. EVANS

1214 Cherry Street, Toledo 4, Ohio
4911 Van Epps Road, Cleveland 9, Ohio

POSITIONS VACANT

Wanted: Carpenter foreman thoroughly familiar with bridge construction. Must understand plans. Respond to publication. P-6123, Engineering News-Record.

Superintendent experienced in heavy sewer & water main construction under difficult conditions, by N. Y. State Contractor. Permanent position for qualified, responsible person looking for advancement with established firm. P-6165, Engineering News-Record.

Gunite man experienced in concrete repairs and pressure grouting. P-6170, Engineering News-Record.

Nationally known southern engineering firm, has opening potential for Chief Engineer. Graduate Engineer, age 45-55, experienced in engineering organization and administration, with thorough knowledge and experience in industrial, commercial and institutional design and construction work. Give detailed historical and professional records, availability and salary requirements. All inquiries confidential. P-6067, Engineering News-Record.

Payment Estimate Engineer: Highway Construction experience of at least five years. Specific emphasis is placed on maintenance of records, preparation of payment estimates, change orders and extra work orders. Starting salary $7,500.00. Chicago location. Please write fully and in confidence. P-6079, Engineering News-Record.

University Career for Engineers—A number of teaching posts are open at a Canadian Engineering College in the fields of Civil, Electrical and Mechanical Engineering. The academic term extends from September 15th to May 1st and summer months are free for study, research or professional practice. Teaching loads run at 6 to 9 lectures and 3 to 9 laboratory hours, with a maximum of 15 hours per week. Salaries are open, depending on qualifications. Good pension and medical plans. Prime present requirements are in the fields of hydraulics and electronics but engineers in any of the three major fields are invited to inquire. P-6229, Engineering News-Record.

Wanted—Yard Supt. for precast, prestressed concrete plant in Northern N. J. Man that can take full responsibility. Send resume and salary wanted to: P-6221, Engineering News-Record.

Estimator-Junior, experienced general construction, take-off and pricing. Unusual opportunity to grow with expanding Westchester firm. P-6224, Engineering News-Record.

Const. Asst. Mgr. for Bergen Co. Industrial Builders. Must be P. E. tops in estimating field, State salary, buss following. P-6010, Engineering News-Record.

Wanted: experienced estimator to take charge of estimating and purchasing for general contractor in Southwestern Michigan. Send resume of experience together with salary requirements and date available to: P-6187, Engineering News-Record.

(Continued on page 111)

WANTED STEEL SHEET PILING DISTRIBUTOR

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RW-6145, Engineering News-Record
Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

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It will help to keep our readers interested in this advertising if you will acknowledge every application received, even if you merely return the letters of unsuccessful applicants with, "Position filled, thank you" written or stamped on them. If you don't care to reveal your identity, mail them in plain envelopes.

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P-6083 Engineering News-Record, 1125 W. 6th St., Los Angeles, Calif.

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Several years' experience in highway or bridge design work preferred but not necessary if educational background is good. This firm of Consulting Engineers is anxious to employ men who desire long range permanent work, who want to develop as professional engineers and who are eager to accept ever increasing responsibility.

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Positions in the above categories available in permanent company offices at Chicago and San Francisco.

Please reply giving experience record to:

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P-6135, Engineering News-Record
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P-6201, Engineering News-Record
520 N. Michigan Avenue, Chicago 11, Illinois

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POSITIONS VACANT
(Continued from page 108)

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Come to the Fair!

Reporting from Belgium on major construction projects under way for the 1958 Brussels World's Fair, ENR's editor, Waldo Bowman, raises an interesting question: Do the spectacular pavilions he has seen under construction there merely represent the unusual in contemporary design, or are they to have important influences on structures of the future?

This is not to ask if any of the more bizarre buildings there will become commonplace, for such is surely not the case. The Atomium (see cover and p. 36) is no more apt to find practical application after functioning as the theme of this '58 fair than did the Trylon and Perisphere find use beyond the '39 exposition in New York. It is rather a question of whether the thin-shell structures, cable-hung roofs, hyperbolic paraboloids, and prestressed spans that add up to "the most arresting structural engineering show of the century", are just today's trick designs, or tomorrow's fundamental forms of structural engineering and architecture.

Whatever the answer, this much is sure from Waldo Bowman's reporting: When the gates are opened next April, and the good Belgian people sing out some Belgian version of "Come to the Fair!", architects, engineers and construction men of many nations will have created a light, airy city of plastic, glass and startlingly new structural forms. Beginning years earlier, Belgian engineers will have planned and prepared the housing, the transportation and the parking facilities for peak-day fair attendance expected to reach half a million.

As is quite usually the case, the engineers, architects and constructors will have preceded all others, this time to create buildings—a show in themselves—which certainly will impress Brussels fair-goers with the latest in structural expression of many lands: today's most unusual—perhaps tomorrow's norm.

Computers Aid Pile Driving

Engineers who use pile formulas as a check against their computations for the safe loads on piles will find much of value in Edward A. Smith's account of how the Raymond Concrete Pile Co. is applying electronic digital computers to a determination of the driving resistance of piles (ENR Sept. 5, p. 46). Wave action is set up in a pile when a hammer blow is applied to one end, as is done in pile driving. This has been recognized for many years, but attempts to apply the wave equation to pile-driving studies have come to nought due to such complicating factors as the action of rams, type of cap block, type of pile and character of the ground into which the pile is being driven.

That situation has been completely changed by the advent of electronic digital computers. Computations that were hopelessly involved now can be made in minutes, according to Mr. Smith. However, this does not mean that a combination of electronic computers and pile formulas now can be substituted for engineering skill in evaluating the ground conditions.

In this connection, it is interesting to point out the report on London's recent conference of the International Society of Soil Mechanics and Foundation Engineering (ENR Sept. 19, p. 87). Canada's Robert F. Legget, who was elected North America's vice president of the society, reported to ENR that discussions of pile bearing capacities provoked what was probably the most lively session at the spirited London conference. And the sense of the meeting was clearly, reported Mr. Legget, that proper use of piles is still an art.

As Mr. Smith points out, "knowledge of ground characteristics is essential." What the computers provide is a greatly improved position for the engineer charged with determining the safe bearing capacity of a pile.

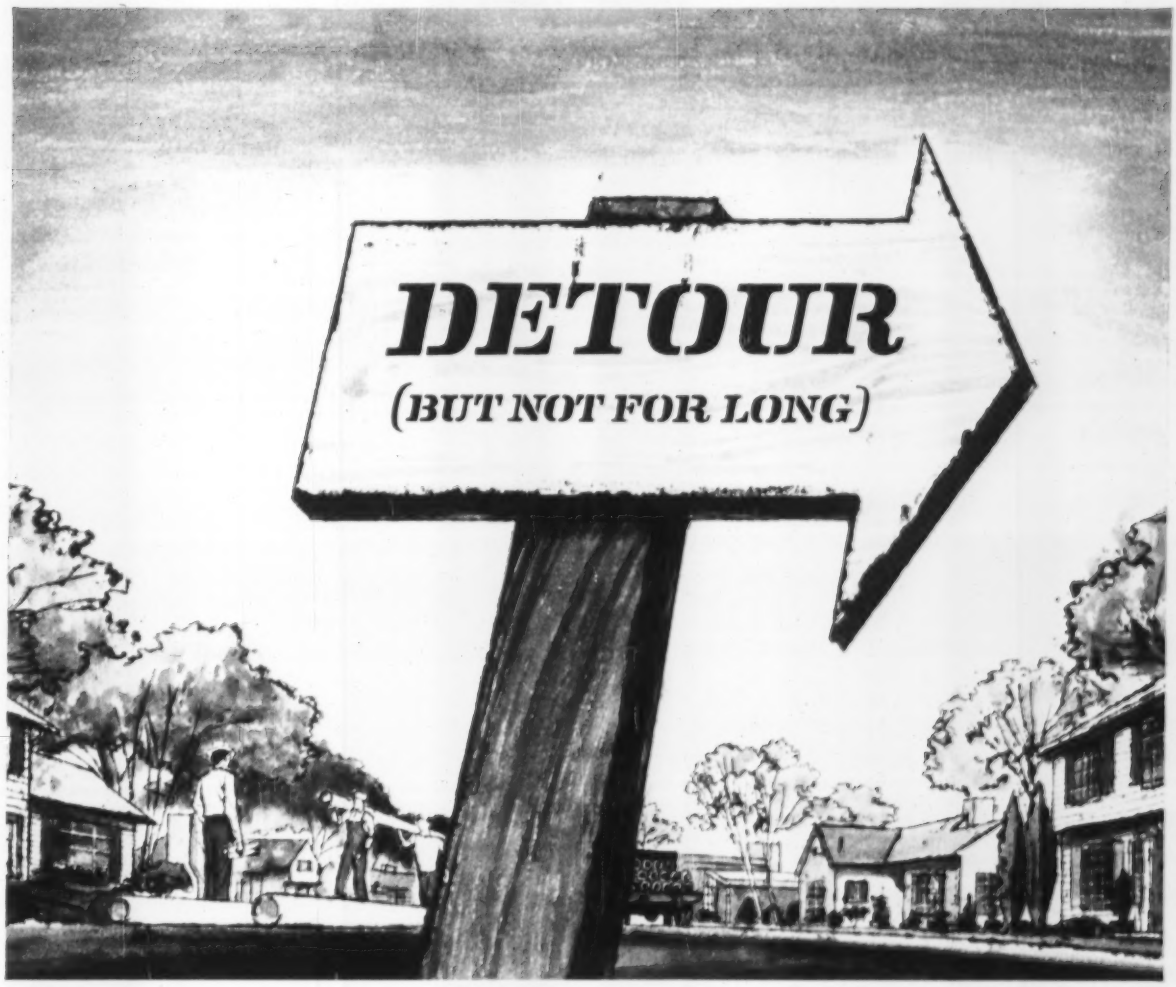
Engineer's Goal: Management

Would engineers in industry aspire to management even if they could go as far in strictly engineering work? Half of them would. This is one particularly interesting finding in a "career satisfactions" study done by Opinion Research Corp. of Princeton, N. J. (see p. 27).

The reported yearning for managerial responsibilities among engineers does not really come as news. But it is interesting that half of those polled would aspire to management even if engineering would take them as far up the ladder (salarywise as well as otherwise, it is to be assumed).

If this is true, and all things being equal, half of industry's engineers would eschew engineering for management, then industry had better take heed. For in a Harvard Business Review article published as recently as last spring, it was proposed that engineer productivity might be increased by raising the rewards for technical men, making it less desirable for them to seek management posts. The author called it a mistake to reward technical creativity or brilliance with advancement to a non-technical managerial level at which such talents are not needed. In too many companies, making engineers administrators is the only reward that means anything, said this article. This seems to make sense, but now comes the Opinion Research report, stating that although engineers in industry are in general a fairly satisfied lot, half of them would leave engineering tomorrow for a management job—even if engineering promised equal advancement.

Industry might find a way out of this apparent quandary and might also increase engineer productivity by letting engineers administer engineering efforts to a greater extent, with rewards equaling those on the non-technical management ladder.



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